

3dcreativity

123

Issue 123 | November 2015



+plus

- Insights into videogame art
- **Scientific visualization in 3D**
- Rendering mechs in KeyShot
- **Sci-fi aircraft in 3ds Max**
- Realistic hair with Maya and ZBrush
- **and much more!**

CREATING CARTOON SCENES

Zeno Pelgrims walks us
through making a fun
fantasy image

Editor's letter












MARISA LEWIS
Junior Editor

Welcome to 3dcreative issue 123!

We're bringing you a jam-packed issue this month, with brilliant interviews and tutorials for you to get stuck into! Learn how to make sci-fi ships in 3ds Max and Maya with Victoria Passariello and Rory Björkman, or if you're in the mood for some character art, pick up some valuable tricks from Roumen Filipov and Ryan Reid.

The inimitable Eric Keller shares his perspectives of 3D as a tool to make science fun and more accessible, while Zeno Pelgrims shows us how he made this month's starring cover image. We showcase ten of our favorite images in the gallery, and much more besides. We hope you enjoy this issue and keep on creating!

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Contributors



MICHEL LANOIE

Michel Lanoie has worked on *Deus Ex: Mankind Divided* as a senior level artist since pre-production, and is now an assistant art director at Eidos Montreal. He chats in-depth with us about his career so far.



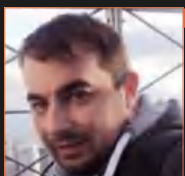
JESSICA TC LEE

Jessica TC Lee is an experienced concept artist and award-winning illustrator working in a game studio as the leading concept artist, and is currently residing in San Francisco.



RORY BJÖRKMAN

With a background in traditional art and sculpture, Rory Björkman is currently studying Media at the National College of Art and Design in Dublin, with a focus on digital arts.



ANDREW FINCH

Andrew Finch is a principle environment artist for Microsoft's Rare Studio. He has eight years' industry experience and is now working on his tenth professional game.



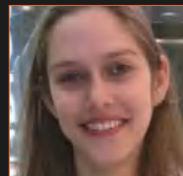
RYAN REID

Ryan Reid is a 21-year-old artist currently studying 3D graphics and product design at the College for Creative Studies. He shows us how to create realistic hair with Maya and ZBrush.



ERIC KELLER

Eric Keller is a CG artist, instructor and entomology enthusiast working in both the entertainment industry and in scientific visualization. He aims to create 3D art to help educate and inspire.



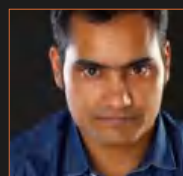
VICTORIA PASSARIELLO

Victoria Passariello creates hard-surface models because she loves robots and 3D. She works at Perihelion Interactive making ships for sci-fi videogame *The Mandate*.



ROUMEN FILIPOV

Roumen Filipov is a 3D generalist born in Bulgaria, currently living in Brazil. His specialty is making 3D characters for film and the advertising agency. Here, he sculpts a fun sci-fi character.



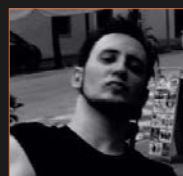
VICHAR BN

Vichar BN is a digital and traditional sculptor with 16 years' experience sculpting characters, sets and props. He currently works at Technicolor India as a supervisor for the gaming division.



ZENO PELGRIMS

Zeno Pelgrims is a student currently completing his last year at Bournemouth University. He's probably waiting for some uncompleted render buckets while creating exciting cartoon concepts.



FABRIZIO BORTOLUSSI

Fabrizio Bortolussi is a freelance concept designer and monster maker for the film and videogame industry. His areas of expertise are modeling, sculpting, texturing, illustration and concept design.

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Special thanks to 3DHype, Hiperia 3D and Veegraph for supporting 3dcreative with banners. Contact Kinnor Wroughton if you would also like to show your support: kinnor@3dtotal.com

Your Magazine.

Get the most out of it!

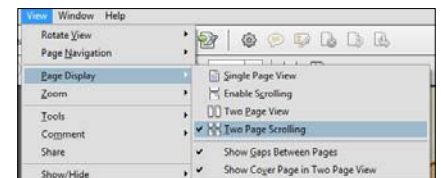
If you're having problems viewing the double-page spreads that we feature within this magazine, then follow this handy little guide on how to set up your PDF reader!

Top tips for viewing

For optimum viewing of the magazine, it is recommended that you have the latest version of Adobe Acrobat Reader installed. You can download it for free here: **DOWNLOAD**

To view the many double-page spreads featured in 3dcreative magazine, you can set the reader to display "two-up", which will show double-page spreads as one large landscape image:

1. Open the magazine in Reader;
2. Go to the **View** menu, then **Page Display**;
3. Select **Two Page Scrolling**, making sure that **Show Cover Page in Two Page View** is also selected.



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Visit http://www.3dcreativemag.com/resources_2015.html if viewing from a mobile device.

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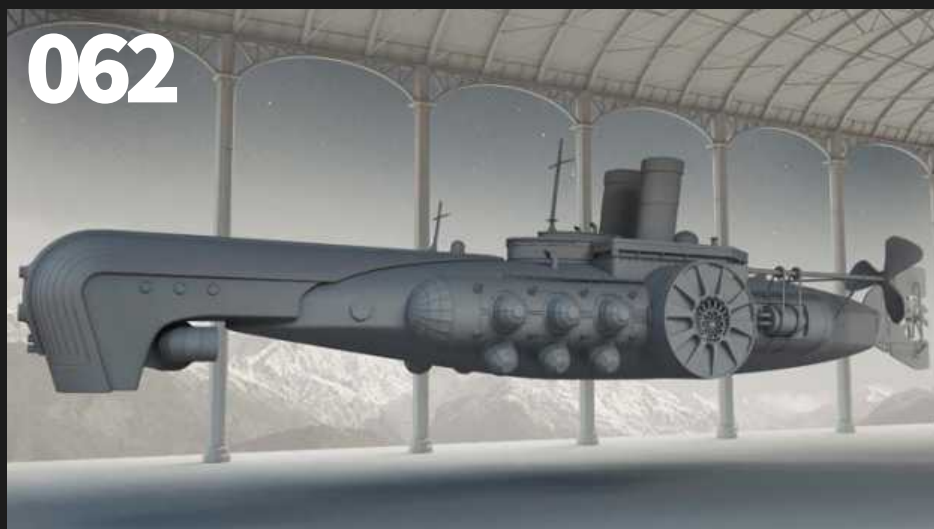
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Learn how to sculpt a macabre ZBrush monster design with Fabrizio Bortolussi





034



062



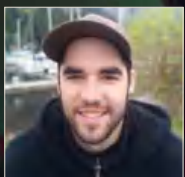
024



006

Art Gallery

Each issue the 3dcreative team selects 10 of the best digital images from around the world. Enjoy!



The Sphere Trail

Calder Moore

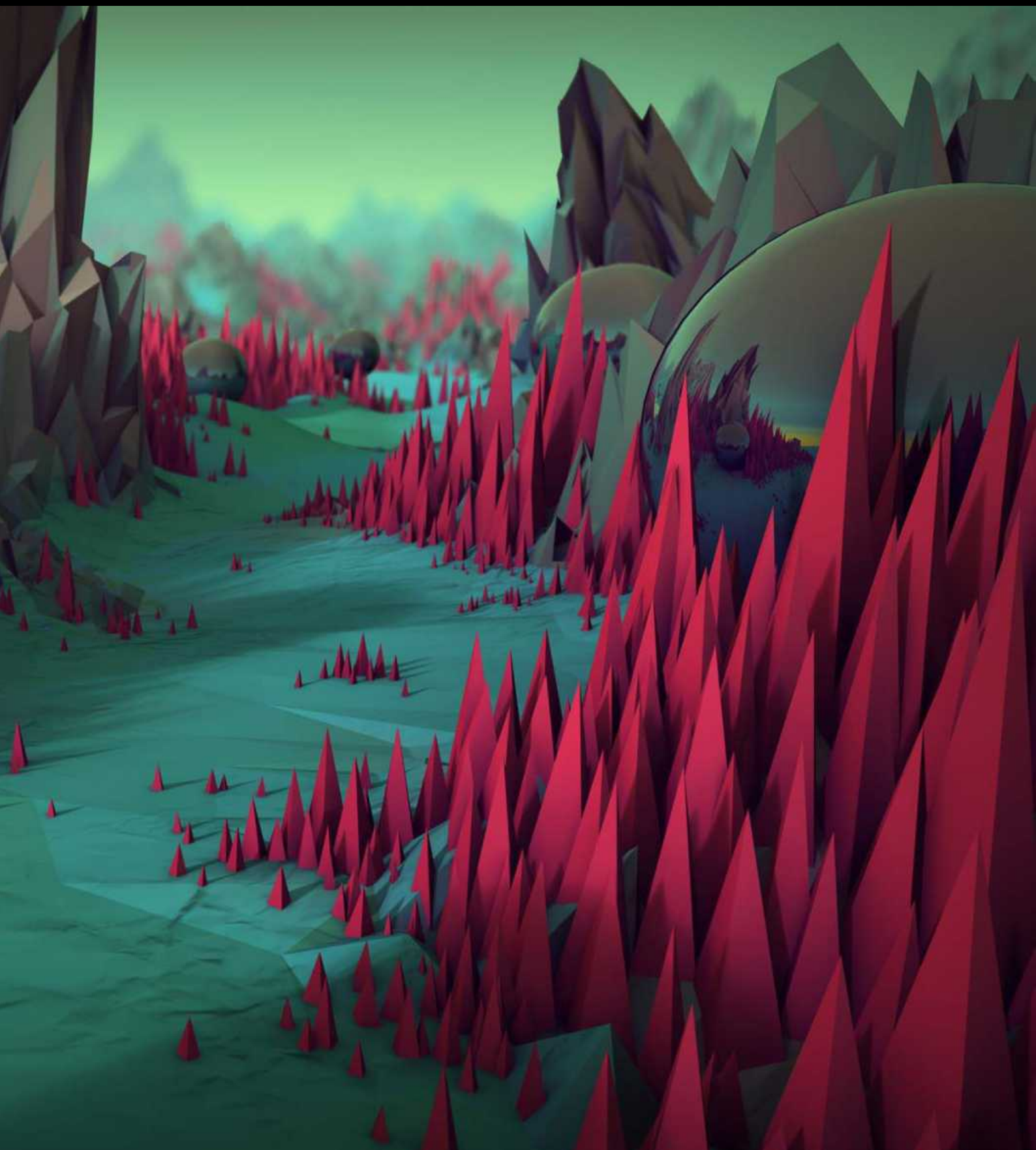
Year created: 2015

Software used:

Softimage

Web: behance.net/refriedspinach

Submit your images! Simply email: marisa@3dtotal.com





1789

Ekaterina 'Katerin' Pushkarova

Year created: 2015

Software used: ZBrush

Web: artstation.com/artist/katerin

ekaterinapushkarova-katerin.tk







Onion Hut

Gannon Faust Jaspering

Year created: 2015

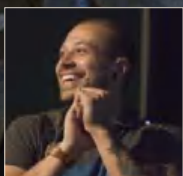
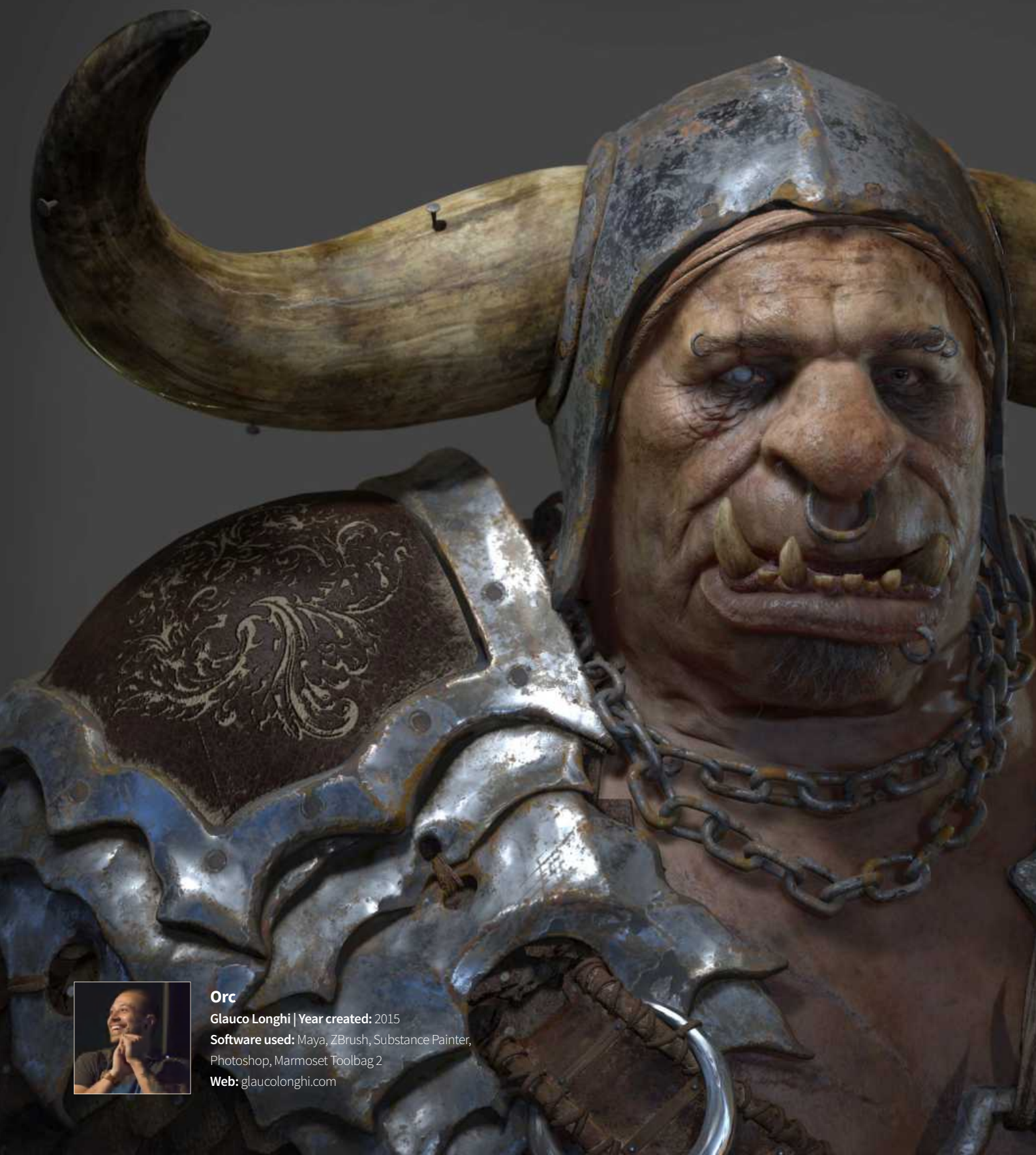
Software used:

Photoshop, Unreal Engine 4,
Maya, CrazyBump

Web: gforgannon.artstation.com







Orc

Glauco Longhi | Year created: 2015

Software used: Maya, ZBrush, Substance Painter,
Photoshop, Marmoset Toolbag 2

Web: glaucolonghi.com





The Astronaut

Hugo Silva

Year created: 2015

Software used: Maya, 3ds Max, V-Ray, ZBrush, Photoshop

Web: hugoarte.com

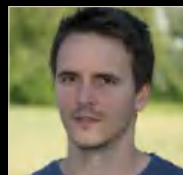
Magic Forest

Manuel Peter

Year created: 2015

Software used: Blender

Web: manuel-peter.com







Post-Apocalyptic Zombie Hunter Vehicle

Humam Munir | Year created: 2015

Software used: 3ds Max, ZBrush, Photoshop

Web: facebook.com/HoumamMunirAbdulAmeer | behance.net/humam3d







Crocodile

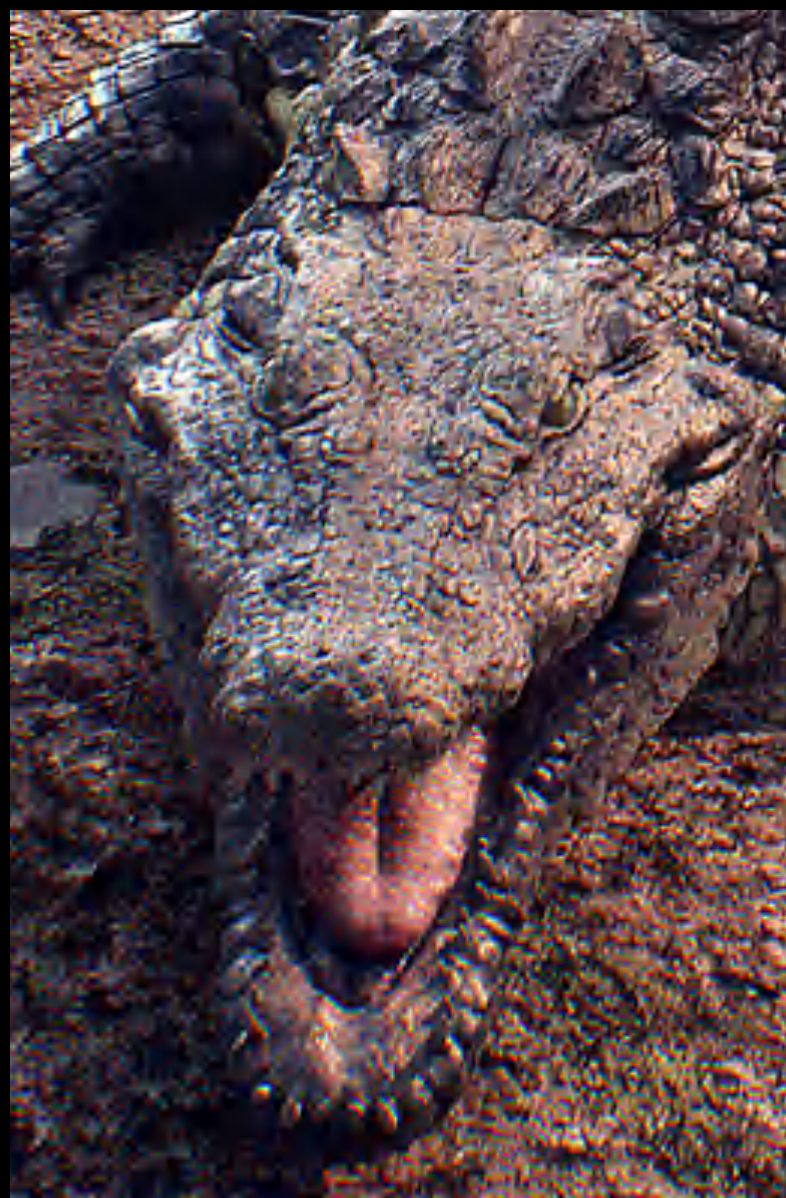
Yuuki Morita

Year created: 2015

Software used: ZBrush, Marmoset Toolbag 2, Maya

Web: itisoneness.com







Cityscape

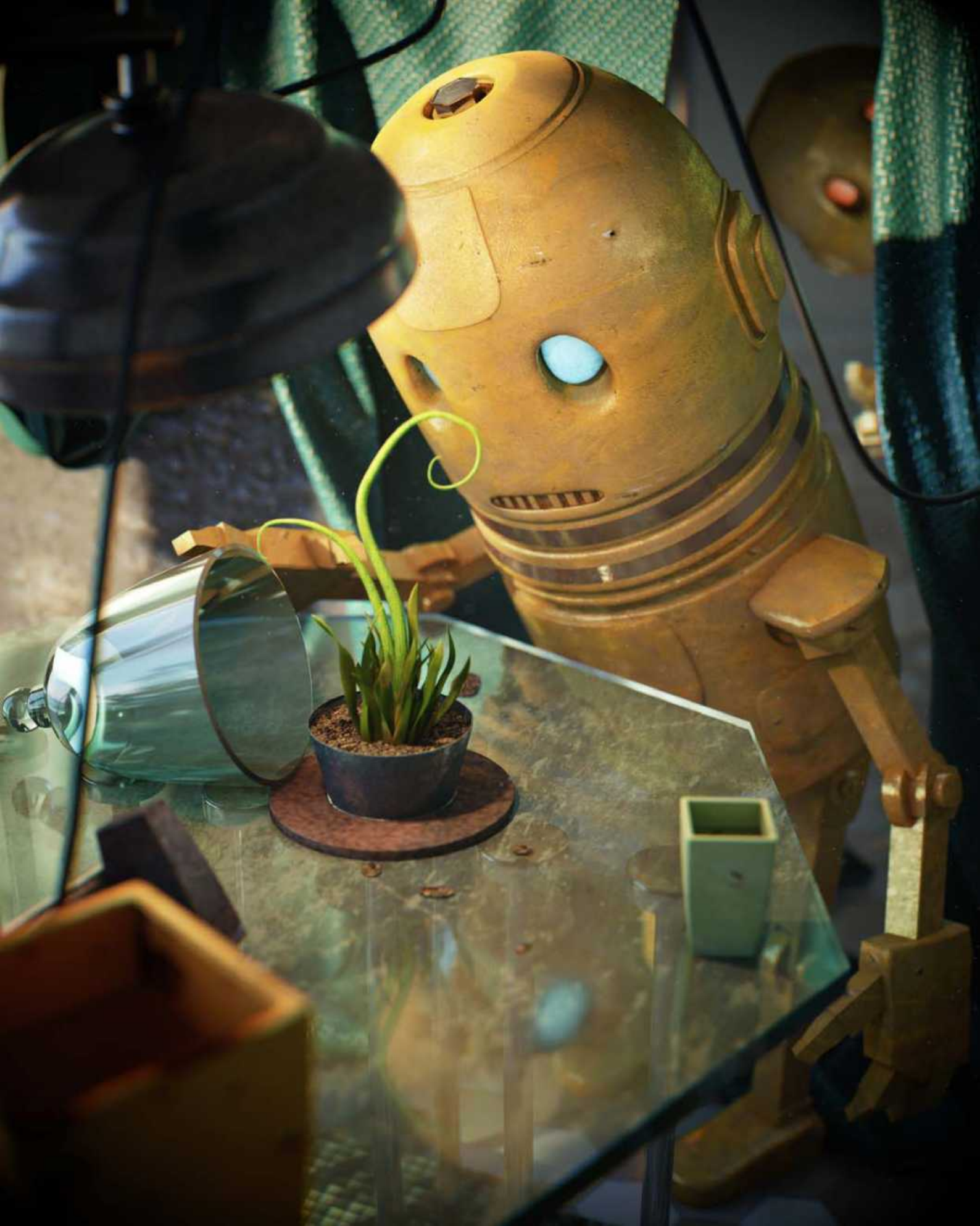
Nikola Sinitsa

Year created: 2015

Software used: 3D-Coat, KeyShot, Photoshop

Web: artstation.com/artist/nikola





Bombi Robot

Ivan Kesić

Year created: 2015

Software used: CINEMA4D

Web: levelart.weebly.com

ANATOMY FOR 3D ARTISTS

THE ESSENTIAL GUIDE FOR CG PROFESSIONALS



AVAILABLE
NOW!



A comprehensive human anatomy guide for today's 3D artist, offering fundamental, theoretical, and practical skills for anatomy and proportion.

Anatomy for 3D Artists is an essential teaching guide for sculpting human anatomy. Non-software specific, it is packed with everything that today's 3D artist needs to know in order to tackle the difficult task of recreating the human form in 3D. Starting with the use of 2D references, and moving on to practical and advanced 3D sculpting – including topology – the book covers every stage in the creation of all kinds of male and female figures. Featuring established artists such as Chris Legaspi and Mario Anger, *Anatomy for 3D Artists* also includes several master projects for an informative and in-depth overview of the 3D sculpting process of various forms, showing how the archetypal human form can be adapted to fit any character shape!



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The Artist



Eric Keller

Lead visualization artist
at Digizyme Inc.

bloopatone.com
digizyme.com

Interviewed by:
Marisa Lewis

Eric Keller is a CG artist,
instructor and entomology
enthusiast working in both
the entertainment industry
and in scientific visualization.



Scientific visualization in 3D

We speak to CG artist and entomology enthusiast Eric Keller about his work and interests, and applications for 3D outside of the entertainment industry ►

Eric Keller works in entertainment and scientific visualization as a CG artist and instructor. He uses CG tools to help researchers and teachers visualize discoveries and educate the public, and has authored multiple books on 3D art.

3dcreative: Hi Eric, thanks for talking to us! Could you tell us a bit about who you are, where you are, and what you do?

Eric Keller: I am a CG artist with around 18 years' experience living and working in Los Angeles. I am a generalist who works in both the entertainment industry and in scientific visualization. In addition to the work I do for clients I'm also an instructor.

I've been teaching ZBrush and Maya at the Gnomon School of Visual Effects in Hollywood since 2008. I've written several books and authored numerous video lectures for Lynda.com, Pixologic, The Gnomon Workshop and Clarafi.com. I love using computers to create art both professionally and personally. I always have a personal project or two in the works on the side in addition to my paid work. I'm really excited about the future of computer graphics and emerging technologies such as virtual reality.

3dc: Did you always want to be an artist? How did you discover 3D?

EK: Yes, I always wanted to be an artist, except when I wanted to be a musician. I started drawing at a very early age – my brothers and I were all avid drawers. We were all old-school *Star Wars* fans (the original theatrical release, back when it was just *Star Wars* and not '*Episode IV*'). We spent hours drawing TIE fighters, X-wings, and Darth Vader on long rolls of newsprint that our mother got for us.

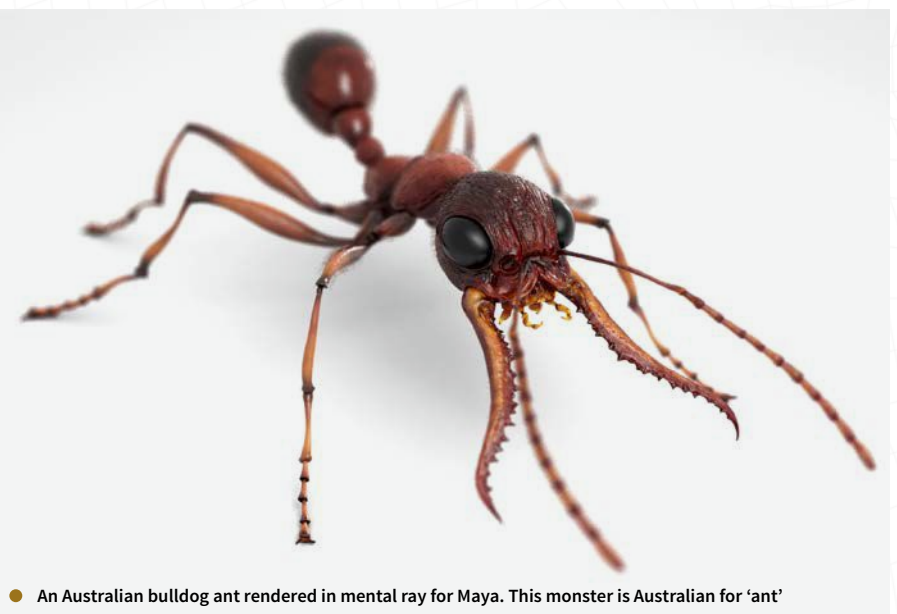
When I was a teenager I decided I'd rather be a rock star than an artist, and I chose the worst possible route for becoming a rock musician: I went to music school. I earned a Bachelor's of Music from Florida State University in classical guitar in 1994. It was not a particularly marketable skill and so the professional music thing didn't quite work out. After a couple of years playing in bands and doing the odd wedding gig, I realized I liked practicing more than performing and I liked eating more than not eating.

Discovering computer graphics rekindled my love of creating visual art and I quickly learned Photoshop and Maya 1.0. Computer graphics suit my personality much more than being a performing musician, and I'm lucky enough to be able to make a living as an artist. Since I first ►

● A leafcutter worker ant of the genus *Acromyrmex*. Modeled in ZBrush and rendered in mental ray for Maya



● A close up of the leafcutter. The mandibles of this ant have the power to saw through a leaf in minutes



● An Australian bulldog ant rendered in mental ray for Maya. This monster is Australian for 'ant'

played with Photoshop back in 1996 I've been creating CG art every day, and I love every minute of it. I occasionally still play my guitar, but only when my computers are all tied up with renders.

3dc: Who or what would you say are your biggest creative inspirations?

EK: Currently my biggest source of inspiration comes directly from nature and the artists who specialize in photographing insects and arachnids. Alex Wild, Nicky Bay, Melvyn Yeo, Piotr Naskrecki, John and Kendra Abbott, and Thomas Shahan are among my current favorites. Drew Berry, who pioneered animating molecular

dynamics within Maya, has had a huge impact on my career as well.

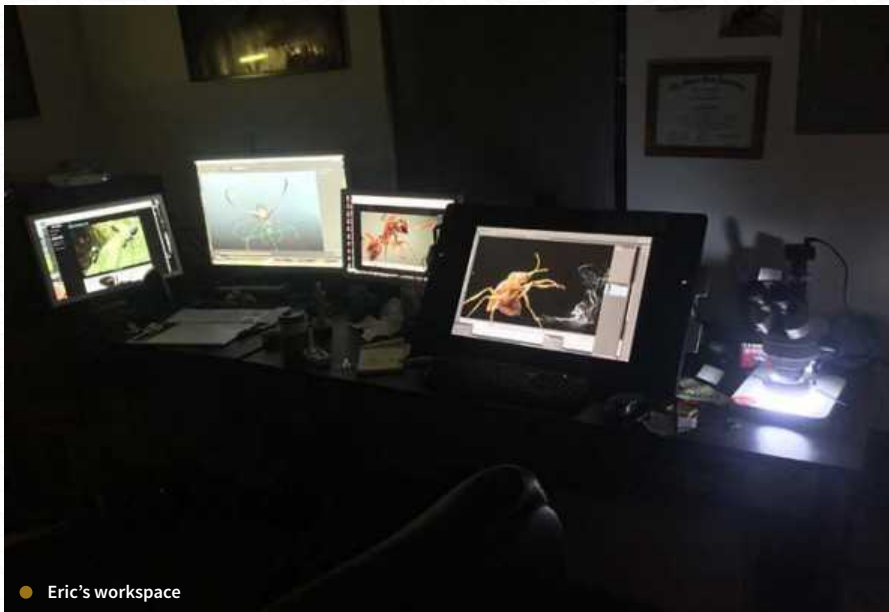
My good friend Gaël McGill, the CEO of Digizyme, is an artist and scientist. His ideas for using 3D animation tools for research and science education are ahead of the curve, and he never



● A shore crab inspired by a recent trip to Cambria, California. Modeled in ZBrush, rendered in Octane

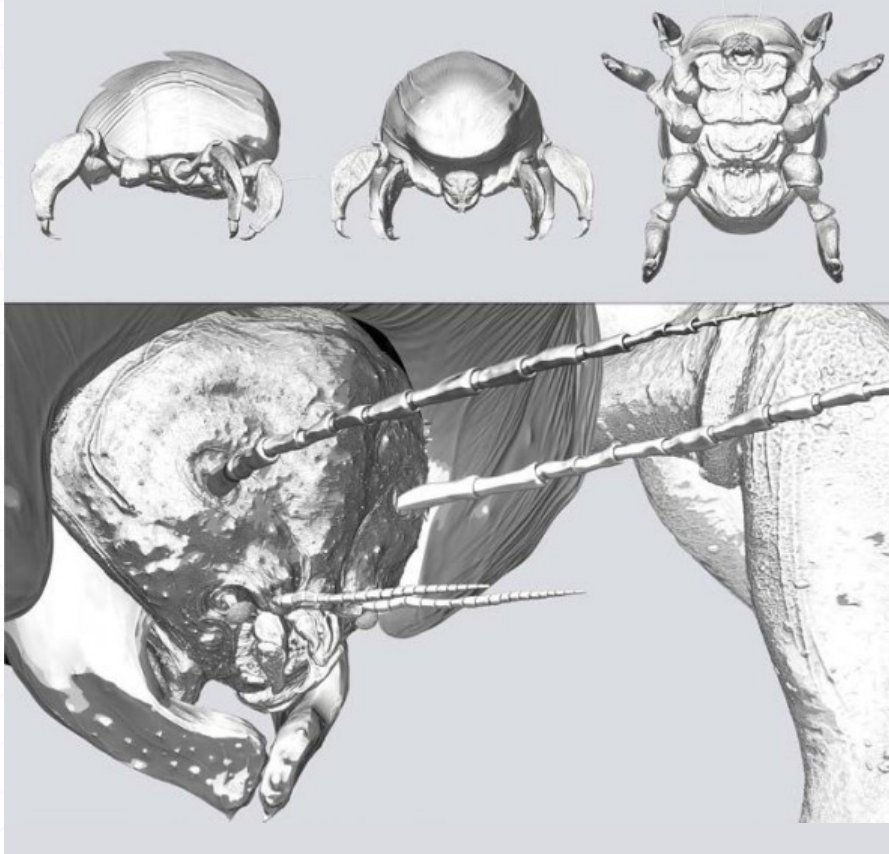


● An alternate view of the same California shore crab. All the rock textures are 100-percent procedural!



● Eric's workspace

● An imaginary mite-like bug modeled and rendered in ZBrush. The ZBrush material was inspired by illustrations in biology textbooks



runs out of ideas for projects that push my limits (in a positive way!) I enjoy working with the other members of the Digizyme team and Clarafi.com; not only are they talented digital artists and programmers, but they are accomplished scientists as well. This is kind of intimidating but it keeps me on my toes.

When it comes to fantasy art I am a big fan of Neville Page, especially his approach to art and

instruction. He is extremely thoughtful about how he works which I really enjoy. I like Terryl Whitlatch, Laurel D. Austin, John Howe, and Ian McCaig, all of whom have a love and respect for the natural world and it shows in their art! Some of my favorite artists are also my good friends; John Brown, who teaches figure sculpture at Gnomon, completely changed the way I view the human form, which has in turn changed the way I see all forms in the natural world. I moved to

🕒 Artist history

Eric Keller's career up to this point...

1996: Accidentally rendered a chrome sphere on a personal computer using Ray Dream Designer and instantly fell in love with creating 3D computer graphics

1998: Created first professional animation of a beating human heart for the Howard Hughes Medical Institute

2004: Published his first tutorial on molecular visualization with Maya in *Highend Magazine*

2005: Moved to Hollywood, CA to study at the Gnomon School of Visual Effects

2005: Started working freelance in the entertainment industry at yU+co in Hollywood, and work at other studios such as Imaginary Forces and Prologue Films followed

2007: Published his first book *Maya Visual Effects: The Innovator's Guide* through Sybex/Wiley

2008: Taught his first ZBrush class at the Gnomon School of Visual Effects

2009: Authored *Mastering Maya 2009* and *Introducing ZBrush* for Sybex/Wiley

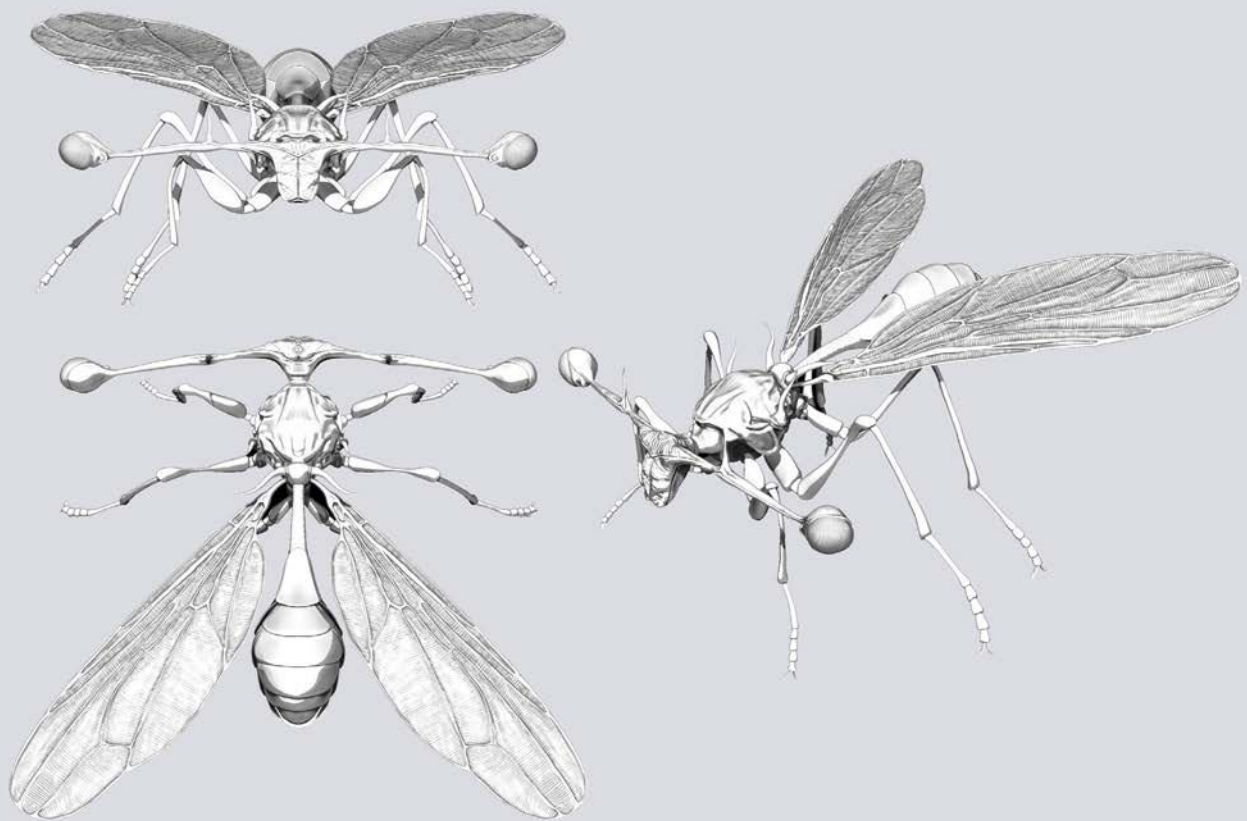
2012: Started work as lead visualization artist at Digizyme for E.O. Wilson's *Life on Earth* digital biology textbook for the iPad

2015: Started his own personal animation series *Entomology Animated* as a free online resource for educators teaching biology

Hollywood from the east coast just to take John's class! I also enjoy the endless conversations (both technical and philosophical) that I have with Mark Dedecker, who is a close friend and an amazing character modeler.

Finally I think Alex Alvarez inspired me quite a bit when I first started learning Maya. I've always appreciated how he worked so hard to master so many diverse aspects of CG, and I've been a big ►

- A ZBrush model of the stalk-eyed fly of the family Diopsidae – further proof that nature is weirder than sci-fi

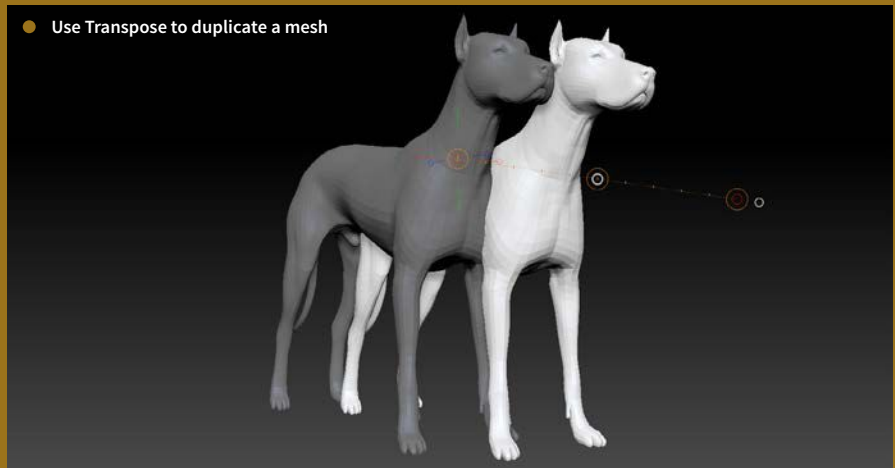


⚡ TOP TIP

Use Transpose to quickly duplicate a mesh

If you need to duplicate part of a mesh within a SubTool, say a tooth for instance, mask everything but the tooth, switch to the Move mode of Transpose, and drag on the center circle while holding the Ctrl key. This duplicates the mesh and automatically masks the original. This only works if the mesh has no levels of subdivision and if the part you're duplicating is a fully enclosed mesh (not connected to the rest of the mesh).

- Use Transpose to duplicate a mesh



fan of his teaching style right from the very start. His recent work in creating digital forests is truly very inspiring.

3dc: Your interest in insects and entomology is a big part of your work. Where did that stem from?

EK: A few years ago I worked on a series of animations with Digizyme for the Boston Museum

of Science which involved modeling, texturing, rigging and animating various arachnids and bugs, including dust mites, ticks and lice and a few other things that are even more disgusting. In the process, I discovered that insects, as a subject, presented some really great challenges for me as a CG artist. And that there are many more beautiful insects and arachnids than there are disgusting ones!

Modeling insects has the best of both worlds: a hard-surface modeling shape language with plenty of organic detailing. And then of course texturing and shading their colorful and translucent exoskeletons is always a lot of fun. Rigging and animating insect models, while not nearly as difficult as rigging a realistic human, is a great puzzle. I like rigging but I'm also impatient. I can create a decent rig for an arthropod in a

● A big-head fly of the genus *Eudorylas*. Eric made this personal study to improve his compound eye modeling skills



couple hours, but doing a human character takes too long for me. Finally, I like the challenge of animating insects and spiders, as each species has its own style of movement, they all have their own personalities and it's fun to try and capture this in motion.

In 2012 I had the good fortune of being a part of the team that developed the animation and interactive illustrations for E.O. Wilson's digital biology text book *Life on Earth* for the iPad. It was a huge project. I spent two years creating dozens of models, animations, and interactive 'widgets' on everything from crab gills to human digestion to ecosystem dynamics. As research I read some of E.O. Wilson's books and quickly fell in love with the story of how social organisms such as ants and bees evolved. His writing on his own career as an entomologist and an evolutionary biologist convinced me how crucial scientific education is right now for everyone. It reaffirmed my commitment to using CG as a way to communicate difficult scientific concepts to students and the general public.

3dc: What software and tools do you use for your artwork, and why?

EK: For modeling I primarily use ZBrush because it has the most powerful sculpting brushes available – the brushes are easily customizable and more responsive than other sculpting software. I use Maya 2016 for retopology, UV, rigging, dynamics, and animation. Maya's graph editor is one of the best animation tools that I've used and I really enjoy Maya Nucleus dynamics and working with Paint Effects. I've used MODO, which has great modeling and rendering tools, but the rigging and animation in MODO is just not as solid as Maya. If they could fix that aspect of the software I might use MODO more.

I have spent a lot of time experimenting with rendering software such as mental ray, V-Ray, MODO, KeyShot and others. Recently I have started using Octane Render for Maya and it has become my favorite. It's very fast, stable, easy to use and my renders look better than they ever have. For compositing I use primarily NUKE but sometimes After Effects. For final texturing I'll use MARI but recently I'm working Substance into my texturing workflow.

At the moment I am in the process of learning Unreal Development Kit, Substance Designer and

Substance Painter. I'm very excited about the prospect of real-time physically based rendering as well as the massive creative potential of videogame technology. My goal is to start bringing my animations and visualizations into virtual reality, and videogame technology seems like the best way to do this at the moment.

3dc: What is your typical 3D workflow like?

EK: I start with reference, always. I want to know specifically what I am modeling down to the species, gender, caste or whatever of the particular organism. Google searches are an okay place to start but much of what is posted online is wrong (usually due to mislabeling). There are a few sites that are great for reference, such as AntWeb. Books are still a better reference for accurate information, especially for anatomical diagrams. If I can get an actual specimen that's even better – I have a dissecting microscope right next to my Cintiq. The best resource I've found is an actual expert. I have made friends with trained entomologists and they help me understand what I'm looking at, and I often send them images for feedback and criticism. For example, Dr. Brian Brown and Emily Hartop at the Los Angeles ►

Natural History Museum are the world's leading expert on phorid flies; if I'm working on a fly, I go to them first and they are often very excited about being able to help me out. I also have a Malaise trap sitting in my backyard so I can collect my own insect specimens.

Once I have my reference together I usually start out in ZBrush using ZSpheres and DynaMesh or both to block out the anatomy of the organism.

I spend most of my time working out the proportions and just getting the basics of the anatomical structure correct. Accuracy is the most important consideration at this stage. Once I have the overall form worked out, I chop the surface up into SubTools (legs, thorax, abdomen, wings, mouth, and so on). I then clean up the topology and use either ZRemesher in ZBrush or bring the parts into Maya and use Quad Draw to retopologize. I bring these back into ZBrush,

sculpt them into their final shape and start detailing. Detailing is where all the fun is, but it's also where I spend the least amount of time (relative to other parts of the process).

Once the model is looking pretty good I use the UV Master ZPlugin to create quick UVs for each SubTool. I'll export these, bring them into Maya and use Maya's UV Editor to fix any issues and arrange the UV shells into more efficient UDIMMs.

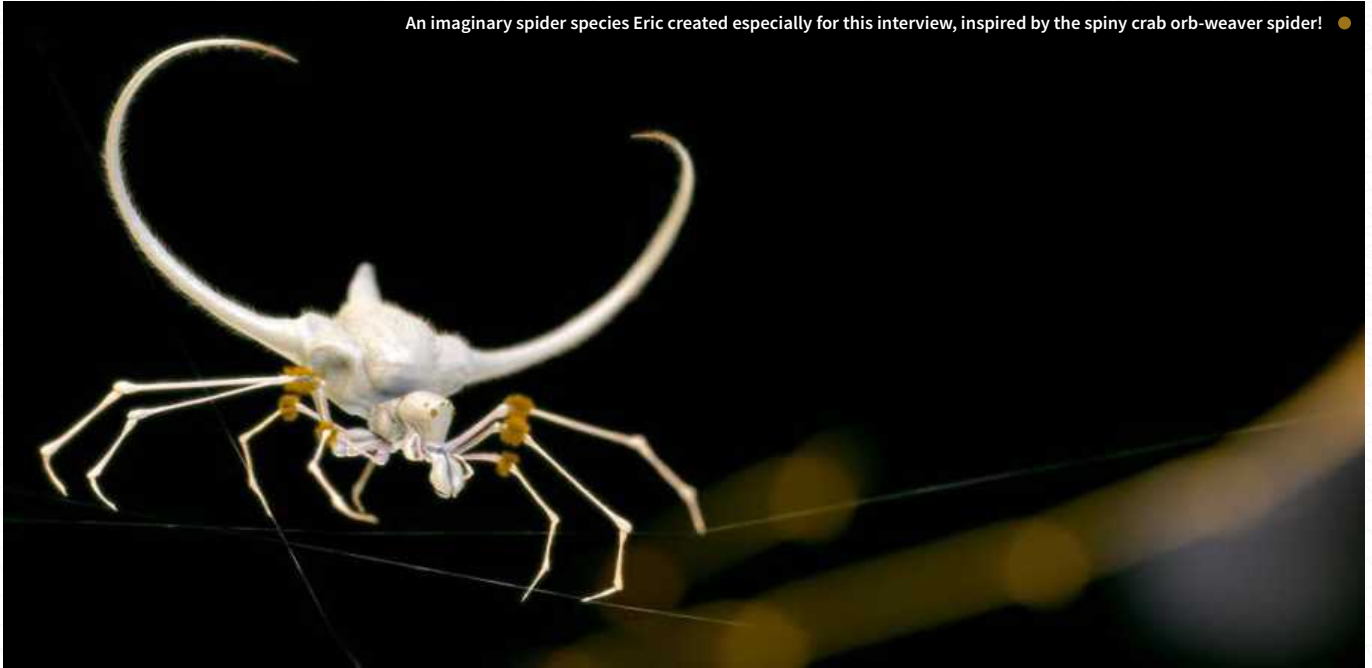
- The head of the fruit fly *Drosophila melanogaster*. This is the subject of a video ZBrush tutorial Eric recorded, available at clarafi.com



- The grisly coffin fly *Conicera tibialis*. Emily Hartop at the LA Natural History Museum is helping Eric to make it accurate as possible



An imaginary spider species Eric created especially for this interview, inspired by the spiny crab orb-weaver spider! ●



Then I import the edited models with the new UVs back into ZBrush and do a quick Polypaint. I use ZBrush's Multi Map Exporter to create quick texture maps from the Polypaint and then MARI or Photoshop to refine and finish the textures. Sometimes I use xNormal to create normal and cavity maps.

With the model fully prepped, I'll bring all the parts into a new Maya scene and begin rigging. It's a lot of labor and prep work but once the rig is complete I celebrate by making the bug do a little happy dance. For hair I use Paint Effects because I know it very well and can do it quickly, although I'd like to start using XGen more on the furrier critters. Octane renders Paint Effects without the need to convert the strokes to polys, so that's another huge time-saver.

Then I create custom shaders, bring in the textures, normal maps and displacement maps, set up lighting and I'm ready to start animating. It takes a long time to do all this but the benefit is I have a growing library of insect models that are immediately ready for animation.

If all goes well, I will render the animation – usually with a number of lighting passes – and I'll comp the whole thing in NUKE. I'm currently trying to become more proficient with the 3D tools within NUKE.

3dc: You also do a lot of teaching and educational work. What have you enjoyed about your experiences as an art instructor?

EK: First and foremost is being in a situation where I'm surrounded by great artists in a

variety of mediums with different backgrounds, styles, and points of view. Both the students and the instructors at Gnomon School keep me really excited about CG, art, and technology. I like bridging the two different cultures of entertainment and scientific illustration. In addition to teaching at Gnomon I've also had a chance to be a guest lecturer at Harvard Medical School. Most recently I've been creating online video lecture series for Clarafi.com. These are lectures on Maya and ZBrush but targeting medical and scientific illustrators and animators who are within the visualization community. Teaching to a wide variety of audiences keeps my brain in good working condition, since it forces me to keep up on the latest tools. I believe that you never really know something well unless you can explain it well. It's very easy in CG to fall back on bad habits or become kind of a slave to the tools, especially if the work gets repetitive.

To teach someone how to do something like sculpt a character in ZBrush or animate cells dividing in Maya means that I have to step inside their head for a bit and try to see the problem from their point of view. The by-product of this is that I develop a wider repertoire of techniques and solutions. There are so many benefits to teaching beyond just the enjoyment of seeing someone realize their artwork, that it's really become a kind of selfish thing, but I think selfish in a positive way.

3dc: If you could give a 3D student one piece of advice, what would it be?

EK: Make every polygon count. And by this I mean challenge yourself to go beyond just

creating something that looks cool, and make something that is meaningful. As technology continues to improve and evolve, more and more of the techniques we use as artists will become automated. It's easier and easier to create something that is technically amazing and visually stunning. In the near future we'll be able to create amazing images, animations, and even virtual worlds like nothing human beings have ever seen before. CG technology is extremely powerful and I think many people underestimate the profound effect CG is having on our culture. There are many people who are dismissive about the importance or usefulness of technologies like videogames and virtual reality, but I think they don't fully appreciate how this tech is going to change human society. Look at how smartphones have revolutionized the way people communicate; virtual reality is going to have ten times that effect.

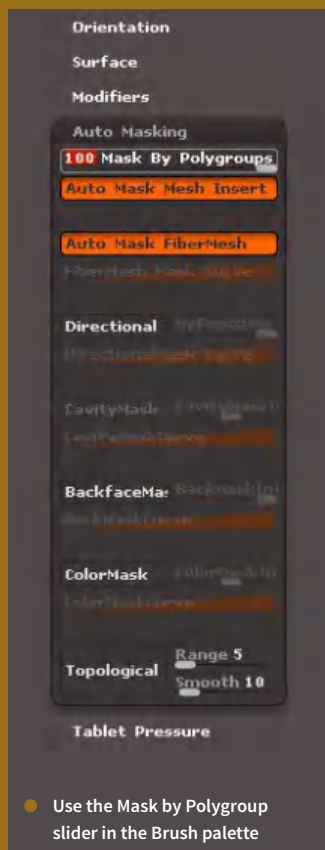
So my advice is to make every polygon count in a meaningful and hopefully positive way. CG can't be just about fantasy and sci-fi; it has to be about something more than just entertainment because it is becoming the new language that we, and I mean all earthlings, will speak. The next time you sit down to start a project, resist the temptation to choose the subject of your art based solely on the fact that it's visually impressive. Instead, choose a subject that is worthy of the attention of a thoughtful artist. The CG art world is filled to the brim with cars, guns, mechs, pin-up girls, Hulks, aliens, trolls, and zombies. What the CG art world really needs is to find a more useful place within the greater culture. I think achieving this goal starts with the artist making a conscious decision to create useful, relevant art. ►

For any student out there, I say seek a subject matter that keeps your art meaningful and you'll never ever get tired of creating it. See if you can identify an unmet need where CG can play an important part and capitalize on that. Your career will ultimately become more satisfying and you'll be employed a lot longer. As you work with people outside of the bubble of the entertainment industry you'll find more enthusiasm and encouragement from the people around you. You might even help make the real world a better place!

⚡ TOP TIP

Mask by Polygroups to increase sculpting speed

In the Brush palette of ZBrush, under Automasking, there is a slider called 'Mask by Polygroups'. If this is set to 100 then the sculpting brushes and Transpose tools will only affect the polygons of the first Polygroup you touch. Using this cuts down on the tedious process of hiding or masking Polygroups manually. You can also create a falloff by setting the slider to a value between 0 and 100. I have customized my interface so that this slider is on the top shelf within easy reach while I'm working.



3dc: Please tell us about some of your recent or ongoing projects. Is there anything we should check out in the near future?

EK: I'm always working on a few personal projects outside of work. Last spring I released the first short video for my series *Entomology Animated*. I thought it would be fun to create the kind of lecture I always wanted to see in Biology class, so I created an animation that talks briefly about the chemistry behind the painful sting of the fire ant species *Solenopsis invicta*. In addition to the science, I added bad puns and a shot of a death metal ant band. Scientists and teachers have really liked it so far and I even got nice compliments from E.O. Wilson himself who sent me a video thank-you message for making the animation. Dr. Wilson actually discovered that

this South American ant species was invading Alabama when he was 13 years old! I posted the animation online for all to view on [Vimeo](#).

I'm working on the next episode in my spare time, which will feature animated battles between ants and a beetle with a short discussion of insect chemical weaponry.

Among my professional projects (stuff I get paid to do), I have recently released an 11-hour video lecture on Maya 2016 through The Gnomon Workshop. This is the fourth video title I've done for them. Previous videos I've done with Gnomon include a lecture on insect design and rendering, 'Using Maya Viewport 2.0' and an 'Introduction to Maya 2014'. I've also recorded a number of online scientific visualization lectures for Clarafi.

The Artist



Eric Keller
bloopatone.com
digizyme.com



com covering various aspects of ZBrush and Maya from beginner to advanced.

As always I have a number of projects I'm working on with Digizyme that involves some cool science and scientists, but I can't really discuss much about it. I have been working on a special small project making models for a UK-based game designer, but I can't really talk too much about that either. And I just started yet another semester teaching 'Introduction to Digital Sculpture' at the Gnomon School of Visual Effects in Hollywood.

3dc: Finally, and most importantly: please share your favorite insect fact.

EK: This is a tough one because there are so many, but I think if I could pick one thing about

insects that always blows my mind, it's the fact that leafcutter ants developed agriculture about 50 million years before modern humans first appeared on the earth. There are several species of leaf- and grass-cutting ants. They have each evolved a highly efficient organized system of cutting up leaves and bringing them back to the nest where they use the cuttings as the basis for growing and cultivating a fungus. The fungus they grow on the leaf cuttings is used to feed the colony. That basically means they are farmers.

This fascinates me because it demonstrates the power of bottom-up design: there is no centralized decision-making process which guides the ants. The ant colony is divided into castes, with each caste specializing in a particular task: workers, soldiers, nurses, and of course the

queen. The physiology of the castes varies widely within the colony – some of the soldiers are many times the size of the workers. Just like the cells in your body specialize to perform important tasks, the ant castes of a leafcutter colony are also specialized for specific tasks, making them a 'superorganism'. Imagine if all the cells of your body could split apart and roam around on the forest floor, only to return to the nest later on to reassemble. This kind of thing amazes me to no end. It's no surprise that scientists researching artificial intelligence are studying social insects such as leafcutter ants, as it's a different type of intelligence, completely alien to our common understanding of human intelligence.

3dc: Thank you very much for speaking to 3dcreative today! ●

The Artist



Michel Lanoie
Assistant art director
at Eidos Montreal
mlanoie.com

Interviewed by:
Marisa Lewis

Michel Lanoie has worked on *Deus Ex: Mankind Divided* as a senior level artist since pre-production, and is now an assistant art director at Eidos Montreal.

Insights into videogame art

Lanoie is a 3D artist with over seven years' experience in the videogame industry. He shares some advice and inspirations with us ▶

Michel Lanoie was born in Montreal, where he's now based at Eidos Montreal. His current assignments are to polish *Deus Ex: Mankind Divided* and settle into his new role as assistant art director.

3dcreative: Hello, Michel! Could you introduce yourself to our readers with a bit about yourself, where you're based, and what you do?

Michel Lanoie: Hi everyone, my name is Michel Lanoie and I work at Eidos Montreal on *Deus Ex: Mankind Divided*. I was born in Montreal, Canada,

a great city for the videogame industry. My dream has always been to work in this field. Now that I've succeeded in that, I think it is still crucial to learn new things. I work on personal side projects that are unrelated to work, for pure pleasure and at the same time to develop other skillsets.

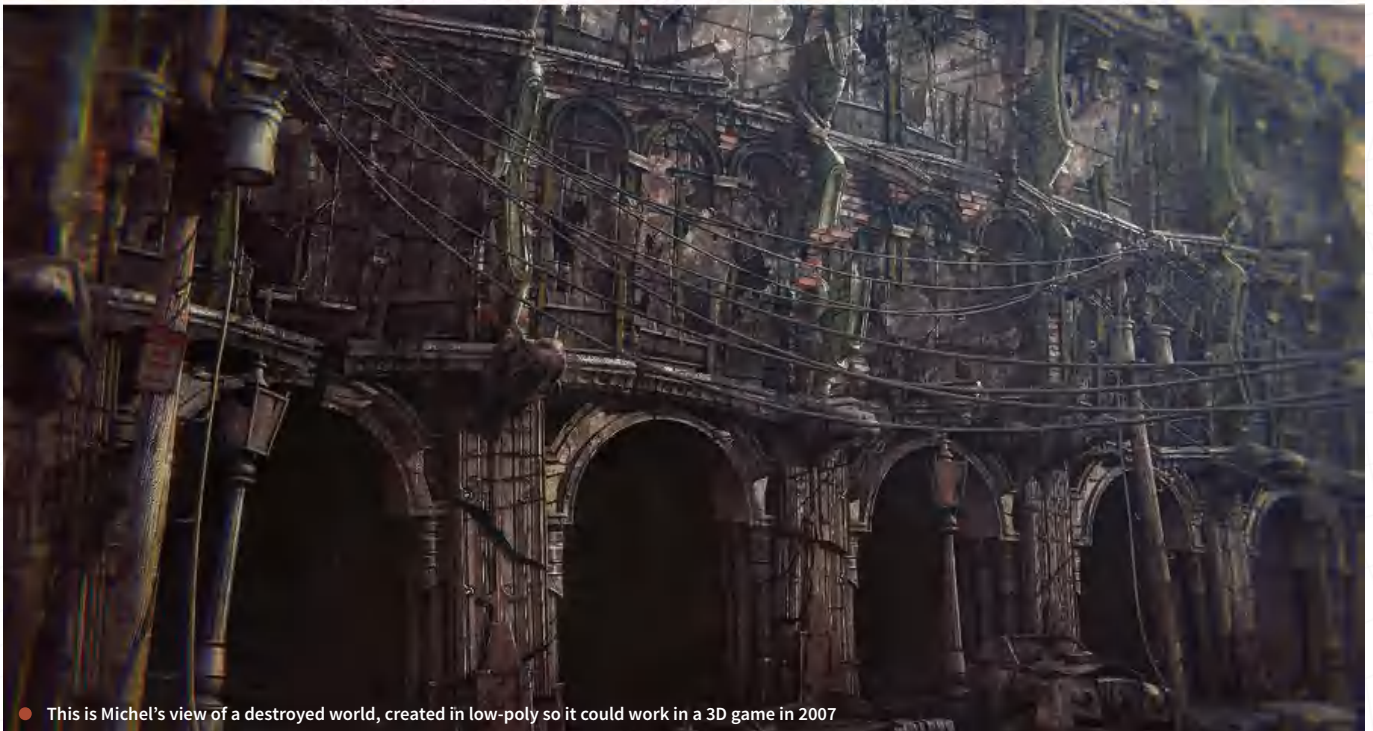
3dc: What is your creative background? How did you come to work with 3D?

ML: Besides the fact that I played videogames in my childhood and was fascinated by them, I desperately wanted to know how they were

made. I had to learn their secrets. I realized that the possibilities were endless with 3D art.

I did traditional art before but I always felt that I could do something more. That's how I came to ask for 3D training books one Christmas. My parents were happily surprised because they saw the potential this had, and so they were very supportive of me. The very first 3D software I learned was Bryce and from that I switched to 3ds Max.

3dc: Who or what are your biggest inspirations? ►



● This is Michel's view of a destroyed world, created in low-poly so it could work in a 3D game in 2007

ML: I think I find the most inspiration simply by observing my everyday environment. I like to analyze how things are made and why, the way they are placed and for how long. If I'm on vacation somewhere I will without doubt take many more reference pictures than pictures of my girlfriend, sadly for her, but she understands.

But more specifically, I read sci-fi books and comics, I watch sci-fi movies and TV series, I play sci-fi games – I love sci-fi. I also find lots of

inspiration in other artists' work on 3D websites and in magazines.

3dc: What software and tools do you use for your artwork? Any useful tips, plug-ins or underrated programs that you'd recommend?

ML: I use 3ds Max and Photoshop for personal projects and at work. One useful trick I use sometimes for my personal projects is camera projection mapping. It saves time because you

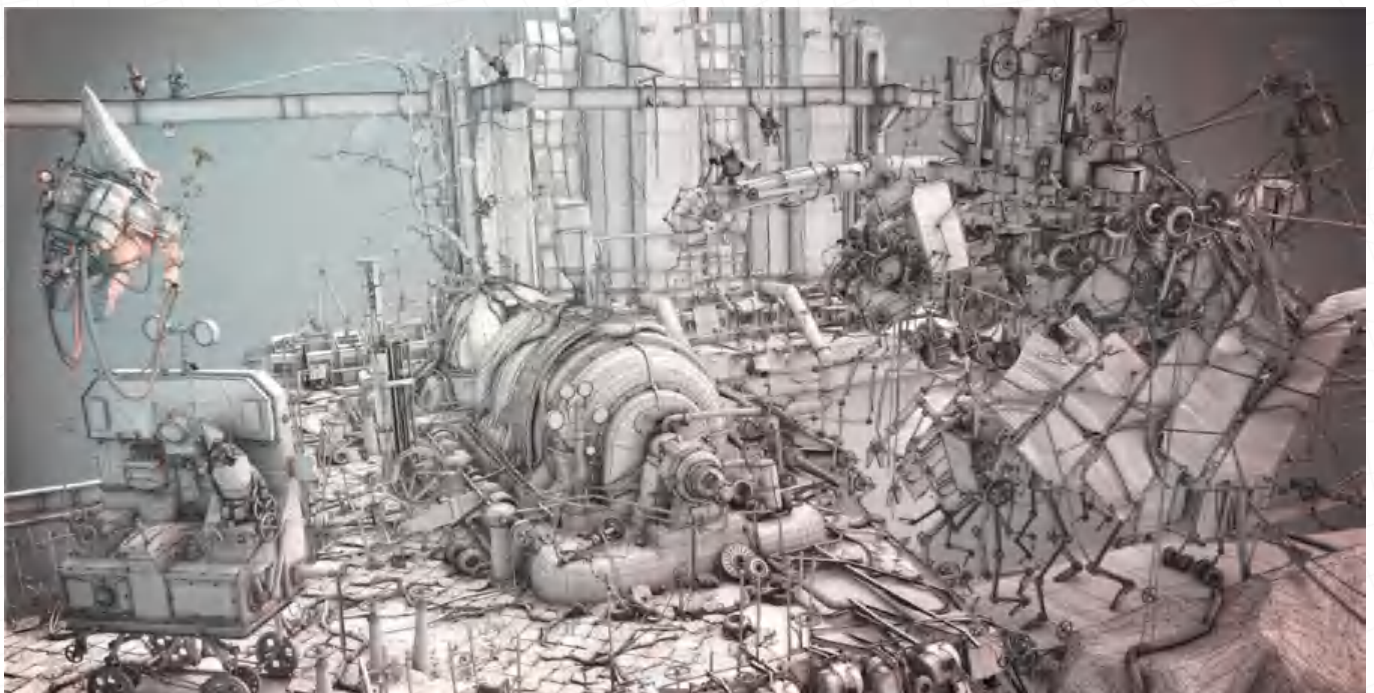
don't have to UV the object, and you can directly paint on the mesh using the camera view you will render with. I use this mostly for background objects as there will be less perspective distortion if I change the camera angle.

3dc: Could you describe your usual 3D workflow?

ML: I always start by searching for reference pictures, not only for modeling but for texturing and lighting. It's a starting point that will make



● In *Mechanical Rebirth*, Michel wanted to create a retro sci-fi scene, based on early 20th-Century technology, using a touch of humor



● Michel's wireframe view of *Mechanical Rebirth*



● Michel's goal for *Tortured Souls* was to make an organic environment and something different from what he was used to



● The idea for this image came to Michel one night when he was trying to sleep. He didn't sleep much that night!

anything you create more credible. When I create a level, I must think about how I can maximize memory usage, pixel ratio and time. I usually start with generic modules, because I know they will be used many times in a scene, even if I wish to do the hero prop right from the start.

The reward for doing that is that as I develop material recipes for those modules; the textures created in the process will be reused in all kinds of forms later on, and probably on that hero prop as well.

After that, I like to do some lighting set-ups because it gives a mood and tells me where I need to put in the details. It also helps me to

tweak the materials accordingly, even if the lighting is not final.

3dc: *Mechanical Rebirth* is one of your most well-known pieces. Could you tell us more about the image and the work that went into it?

ML: This scene took me over three years to finish. It took longer than expected of course, but as I did not work on it very often, the important thing here is that I persevered and finished it until I was fully satisfied with the result.

My main inspiration for this project was 20th-Century technology. Everyday objects were massive and very reliable, and so much easier to

repair than some of today's high-tech hardware is. I wanted to bring back to life that which was previously obsolete.

I also have great appreciation for anything that is man-made and has been abandoned for a very long time. That theme was then reflected as well in my scene.

3dc: What can you tell us about your contributions to the *Deus Ex* franchise?

ML: During *Deus Ex: Human Revolution*, we used an in-house engine and a lot of work had to be done to improve it, and I was involved in its development. I was also involved in the ►

texturing and artistic and technical direction. I had to communicate standards about specific techniques we had to develop, and also quality control and visual style.

During the pre-production of *Deus Ex: Mankind Divided*, I worked with a small team on a visual benchmark demo. The purpose of this was to obtain the highest level of quality from which we could extrapolate the whole game later on. During production, I was in charge of two levels and my biggest contribution was to Golem City. A section of this map was shown during E3 2015. In addition, the announcement trailer of the game was made using assets I created for this level. Right now I am working hard to polish other sections of the game.

3dc: What's one key piece of advice you'd pass on to other artists?

ML: Try to be humble and give credit to other people. Teams tend to become bigger and bigger with time, so team play is crucial to success. It's nice when someone comes to you and tells you your work is amazing. Try to do the same and congratulate someone for the same reason when it comes to it.

When you show your portfolio, please be respectful to the other artists that worked with you. Try to show only your work, and if you can't, describe what your contribution in the frame was.

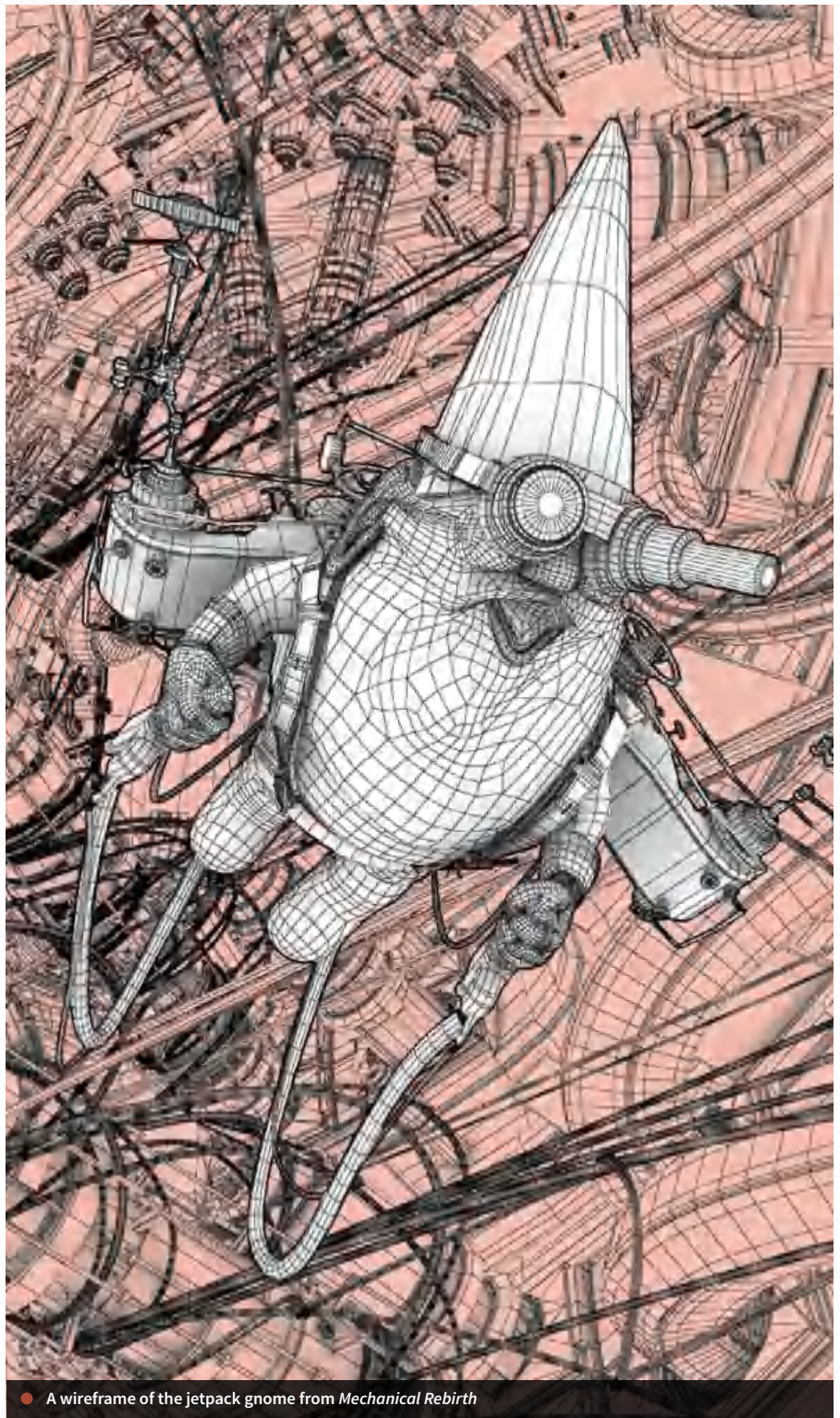
3dc: Which project (personal or professional) are you the proudest to have worked on, and why?

ML: My ruins scene is the personal project I am the proudest to have worked on. It was done at the Centre NAD (National Animation and Design Centre); I had two months to do it and I gave everything I had. It came out well and I was greatly rewarded for my efforts. It definitely helped me to get a job at Ubisoft.

Professionally, *Deus Ex: Human Revolution* was an amazing project. It was a new studio, a new team, a new license and a big challenge. It felt nice to start from scratch and have some leverage to make things better. I truly felt like I was part of a colony on a new world. It was my first true marathon on a triple-A project. It wasn't easy but I felt that everyone joined together and put their shoulder to the wheel.

3dc: Finally, and most importantly: what do you like to do in your spare time?

ML: I like going to the gym or doing any other sports, it clears my mind and helps me to think

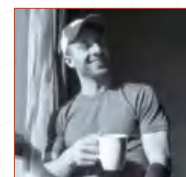


● A wireframe of the jetpack gnome from *Mechanical Rebirth*

of nothing. When I really need to unwind and get some real fresh air, there is a place I like to go in the country. It is a good mix of mountains, woods, swamps and lakes. It feels good to cut off from all that technology sometimes. I also have several home improvement projects I want to do. It's nice to be able to create stuff in the real world and not in a virtual world for once.

3dc: Thank you very much for speaking to 3dcreative today! ●

The Artist



Michel Lanoie
mlanoie.com




● A beauty shot of Michel's jetpack gnome from *Mechanical Rebirth*

This article
contains nudity



The sketchbook of **Vichar BN**

We look behind the scenes of Vichar BN's sculpting process and learn some insights from the artist 

The Artist



Vichar BN

artstation.com/artist/vichar
vichar.carbonmade.com/

Software used: ZBrush

Vichar BN is a digital and traditional sculptor with 16 years' experience sculpting characters, sets and props. He currently works at Technicolor India as a supervisor for the gaming division.

Vichar BN reveals his ZBrush sculpting secrets...

Hi, my name is Vichar BN and I live in Bangalore, India. Having realized my interest in art in my early years, I did my Master's degree in sculpting from Chamarajendra Academy of Visual Arts, and started my career as a traditional sculptor. During this time I had the privilege to work as a personal sculptor for the King of Mysore. The craving to learn new things sparked in me the fascination for CG. The idea of bringing your sculptures to life using technology was very alluring, almost like playing God.

I joined the animation industry over ten years ago, currently working as supervisor for the gaming division at Technicolor India. Over the years, I have pursued my career in art in various different genres and roles: assistant art director for television series, illustrator for magazines, interior and exterior designer, and as a freelance artist. Thanks to the different roles that came my way during all these years, I got to work on a wide array of projects in terms of style and media (from cartoony to hyper realistic assets).

In my sculptures, I attempt to evoke movements, fluidity and patterns inspired by nature, the movement of elements such as wind or water, combined with physical sensations. The ephemeral moment is also a big part of it. In other words, the perpetual motion changes instantaneously and continuously into something else, and what we see at any one moment is just a fragment, a fraction, as if frozen in time. This concept had been percolating in my mind for a while until I felt ready to experiment. The parameters I set were: keep it simple in its expression, avoiding distracting elements and aiming at a sensation of fullness; keep it focused on the main goal of expressing movement, fluidity, sensations and streams of energy.

Speed and multiple iterations of an idea, quickly reshaping a sculpture and keeping some elements of the older iterations without having to redo them; transforming an idea in unpredictable ways and easily exploiting the 'accidents' and having access to an extremely vast group of creative and highly trained, talented people using the same tools, from whom to get feedback. Also, minimal cost in the process since redoing a maquette multiple times with traditional tools can be costly. These tools have changed our thought processes and resulted in a new paradigm

- *Beauty and the Beast* was inspired by the thought of freeing ourselves from prejudice and stereotypes. At first sight, we might assume that the girl is the beauty and the crocodile is the beast. But each year humans hunt and kill thousands of crocodiles for their skin, which is considered beautiful



for creativity. Technology is used in so many different fields, in so many different ways that an infinite number of events or phenomena can now be modeled without needing to

stay within stylistic, intellectual or creative boundaries. Sources of inspiration can come from the most unexpected fields and can be cross-combined in limitless ways. ►

● A sculpt of a hunting dragon



Inspiration and ideas

Like they say, the world is full of magical things, patiently waiting for our wits to grow sharper. My view of creativity is to keep developing strategies to keep the inspiration flowing. It was all about the impulse, instincts, the single-minded vision to create something mostly from feelings and images popping into my mind.

The inspiration is in the constant discovery of the infinite layers of my surroundings. This extends to include everything from the structure of grass, to the depths of our universe. If there is an intention

to understand and completely open oneself up to what is being observed, then patterns start to define themselves and intuitively assemble into interesting pieces of artwork. The richness of these observations is one aspect of inspiration.

Materials

The main software I use daily for digital sculpting is ZBrush. I also use Maya. I am always on the lookout for new software or tools to help speed up my production pipeline and let me do more art and fewer technical processes. ZBrush has totally changed the way I create a 3D model. It's

much more natural, fast and simply is the closest thing to actual clay sculpting, especially for a traditional artist. Thanks to ZBrush, it is now possible to block a simple base shape that can be easily modeled, sculpted, and detailed.

Working with ZBrush is quite fluid and easy, and overall it's the only software that allows sculpting of a 3D model with so much speed and flexibility, while also enabling you to create such detailed refinements on a 3D model. It also lets you create scenery and illustrations which blend 2D and 3D in one environment. ►



● *The Kiss* was inspired by Auguste Rodin's sculpture



- *Veiled lady with lamp, an experimental work in progress*



⚡ TOP TIPS

Figure sculpting advice

Sculpting a portrait is dependent on capturing form and proportions to produce a good likeness. You could do this by sculpting while the subject is posing in front of you, but more often, sculpting is done from photographs. So, it is important to have a good photograph reference of the subject. Here are some tips:

- Don't sculpt what you assume something should look like. Check references.
- Continually study and compare references, keeping references handy.
- When you make a change in one area, check how that change has affected other areas of the sculpture.
- Use a photo-editing program to change the contrast if the photos don't provide good contrast.

Facial expressions

Understanding how expressions affect and change the face is important in sculpting a natural likeness of an individual. Different facial expressions can drastically change the face. For example, a full smile changes the shape of the mouth, cheeks, forehead, and even the eyes.

To be a successful figurative sculptor, a fundamental knowledge of anatomy is an essential requirement. In this case, 'anatomy' refers to the skeleton and muscles, the skin and the fat – also collectively known as 'surface anatomy'.

Skeleton

The skeletal system is the armature on which the rest of the anatomy is built. Understanding the shapes of bones and the way joints articulate and move will help you create figures that are properly proportioned and naturally posed.

Muscles

Muscles are the underlying mass of the human body, especially in the arms and legs. Muscles are composed of microscopic fibers which are collected into larger and larger bundles. The largest of these bundles are visible under the skin, especially when the muscle is doing work. Just take a look at a photograph of an athlete in action, and you will see these muscle bundles.

When roughing in the primary forms on a figurative sculpture, add the mass according to the underlying muscle groups, and then smoothen the clay (or polygons) in the direction of the muscle fibers. Successful sculpting is far more than just having the right tools or the right software. Creating unique figurative sculptures, that are both appealing and that engage the viewer, requires a fundamental knowledge of the anatomy, form, proportions, gesture and emotion.



Sketching workflow

I always start with research. I spend at least a third of my time doing research, downloading photos and analyzing them. I will sketch some simple shapes and make a collage. This way I get to know my subject better and get a clear image of what needs to be done. I cannot stress enough how important this stage is.

I create a character with purpose. From clothing, to expression, to backstory. Where are they from? What is their motive? Your character should not always just 'look cool'. If you plan with intent then it will show in your character. Create a piece that provokes an emotional response. From a personal standpoint, I also create characters that will make me better as an artist as well as touch

on software and technical approaches that I haven't tackled or encountered yet.

My approach is like that of a traditional sculptor. I start with an armature (ZSphere) and then add clay layer by layer to achieve the silhouettes, subtle variations and volume changes. Once the basic form and shape are achieved, I pose the sculpture with Z Rig and work in symmetry to add more weight and tension, to attain a more realistic look. Usually I don't use alphas and instead I try to reach the final goal by manual sculpting. This helps me to learn the strengths and limitations of the software in depth.

My process of late has been more scientific than creative. I like to study the interaction of muscle

and bone in motion and the way light interacts with a surface. And last but not least, feedback is important and it's good to ask people for their opinions. Sometimes they see things that you hadn't noticed. So when you're finished, show your work. It's good to have critics, you can learn a lot from them.

The most important things for me in the figure are the face, the action (movement) and the hands. These determine if a figure is alive or dead. You can make a character with incredible anatomy, realistic textures and incredible details, but if the pose or face don't work the figure will look dead. In ZBrush you always tend to lose your mind detailing things, but I think that is not the most important thing. ●

⚡ TOP TIPS

Form

Form encompasses the overall shape and composition of the sculpture. The form of your sculpture is perceived by how light, shadows, and the transitions in between are created by the underlying shapes. Form is intimately tied to proportions because basic forms correspond to the initial proportions of the sculpture and can also be broken down into planes. For example, the basic form of the head can be reduced to a few planes such as the forehead, nose, brow, cheek, chin and so on. By reducing the sculpture to its corresponding planes, it is easy to see the relationships between forms and proportions.

Negative space and gesture

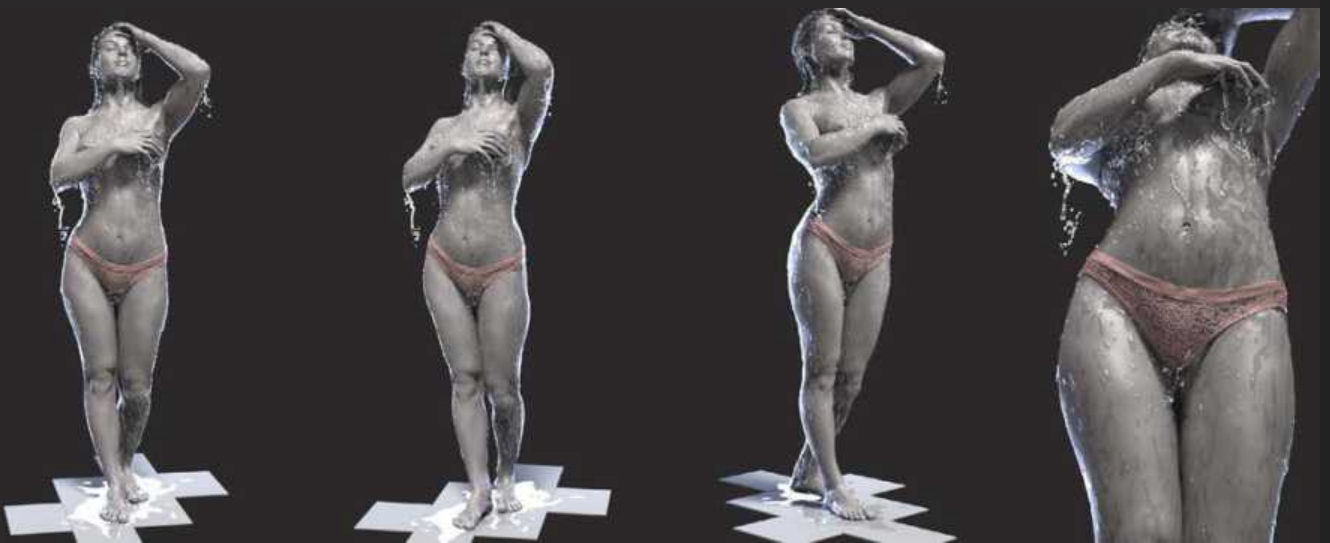
An important but often overlooked aspect of form is negative space. Negative space is the space around and between parts of the subject, or even the entire subject.

Gesture refers to the flow of lines in the figurative sculpture. More precisely, gesture describes the rhythm, weight, and balance in the design of the sculpture. Gesture is what makes a perfectly still sculpture appear to be alive and in motion.

- Inspired by the fairytale *The Pied Piper of Hamelin*



- *A Shower of Summer Days*, one of Vichar's recent works in progress



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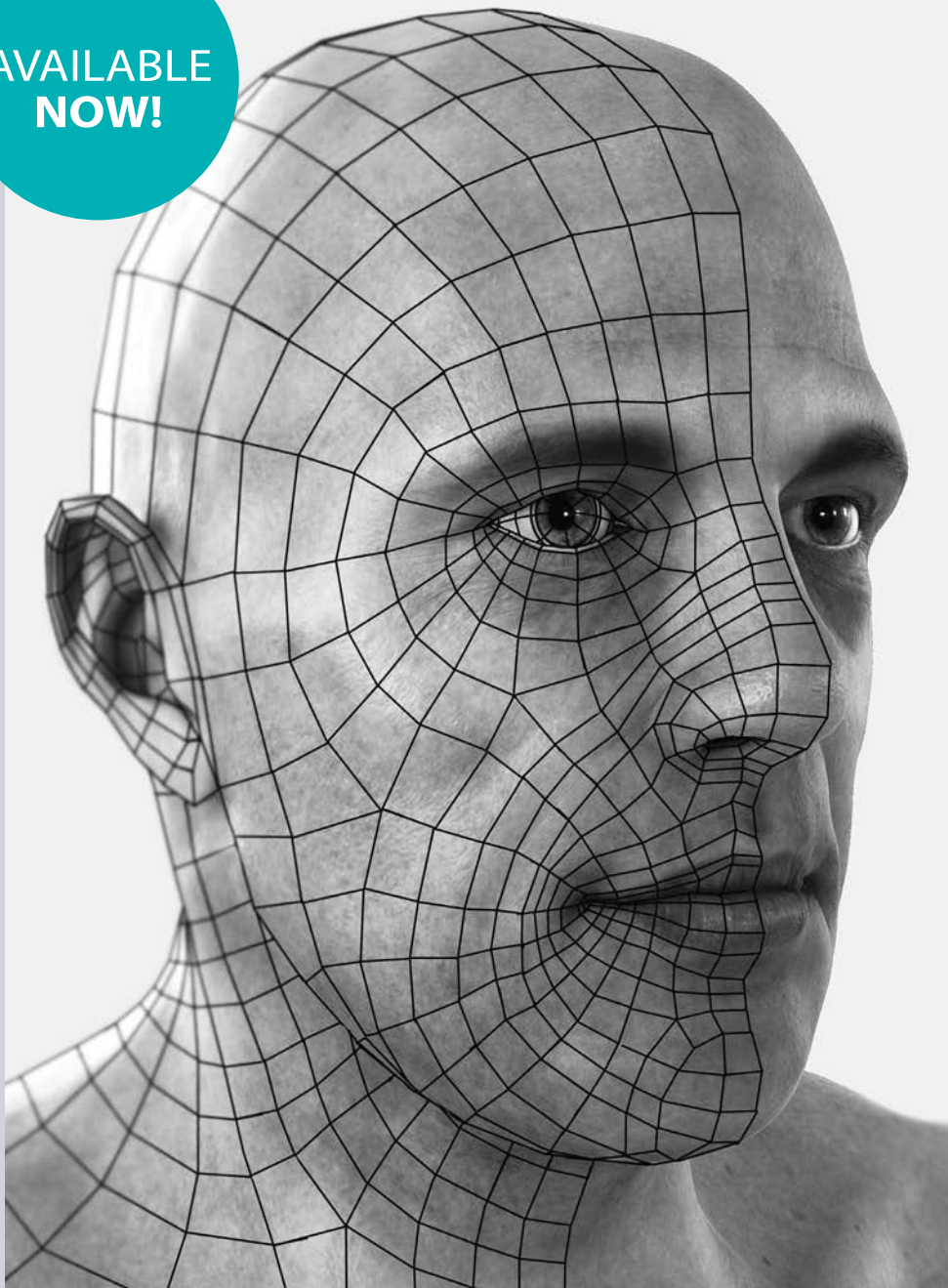
CHARACTERS & CREATURES

PROJECTS, TIPS & TECHNIQUES FROM THE MASTERS

ZBrush is a powerful program offering digital artists of all levels intuitive and inspiring workflow solutions for 3D models and 2D images. Following on from the success of other ZBrush titles such as *ZBrush Character Sculpting: Volume 1*, this new book focuses on the design and creation of a variety of character and creature sculpts by world-class artists including Mariano Steiner, Maarten Verhoeven, Caio César, and Kurt Papstein.

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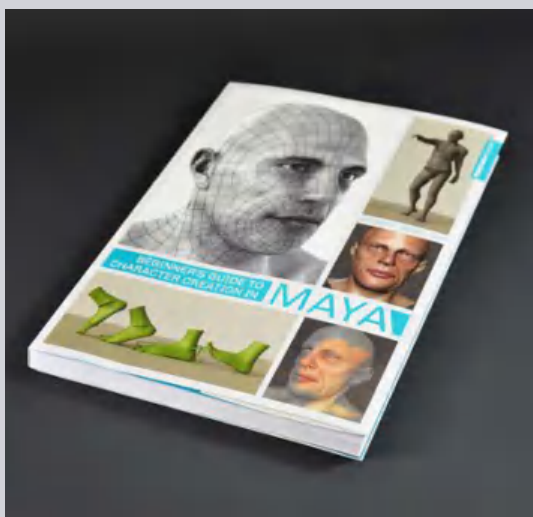
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Rendering mechs in KeyShot

by Jessica TC Lee

Jessica TC Lee shows us how to finish a SketchUp model with KeyShot rendering and Photoshop post-production ▶



The Artist



Jessica TC Lee

jessicatcl.com

artstation.com/artist/j03150315

Software Used:

SketchUp, KeyShot,
Photoshop

Jessica TC Lee is an experienced concept artist and award-winning illustrator working in a game studio as the leading concept artist, and is currently residing in San Francisco.

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Learn how to enhance a simple mech model...

In this tutorial, we will learn about how to complete a portfolio piece of a mech design in SketchUp, KeyShot and Photoshop. The previous part of the tutorial covered the process of designing the mech from thumbnail sketches to a finished 3D model.

In this next part, we will cover labeling the model's IDs, where we'll think about the distribution and proportions of the different materials. Then we'll move on to posing the model, and discuss how the camera angle would affect the pose. After that, we'll take the model to KeyShot to assign materials to the different parts. We'll touch on the basic interface and some important tools in KeyShot, and use KeyShot's label system to add not only decorative labels but also stains and weathering to the surfaces.

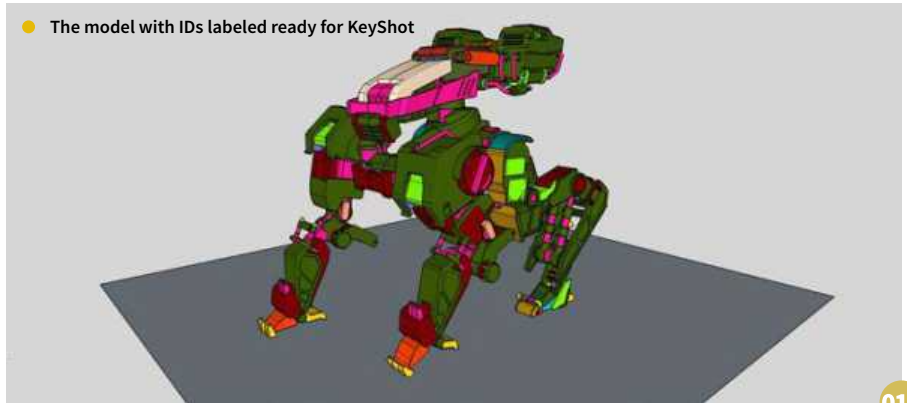
Finally, we'll use Photoshop to do the final touches, where we'll also briefly touch on using good composition and lighting to create an appealing scene, and some basic photo-compositing techniques.

01 Labeling IDs and posing: The model is finished at this point, and it is time to label the IDs which will be used to assign materials later in KeyShot. At this point, I have a general idea of how I want to distribute different materials. Although I'm not sure yet what materials I will use, I know that I want a dominant material that takes up most of the space (dark green), a secondary material for color decoration (dark red), and a third material for creating 'breaks' and adding rhythm to the color distribution (bright green). For some small bits which I'm not yet sure about, I simply choose a new color for easy adjustment later. I also know where I will assign metal, such as the handles, hydraulics, and some parts covered by panels, so I use the same color (pink) for all the metal parts.

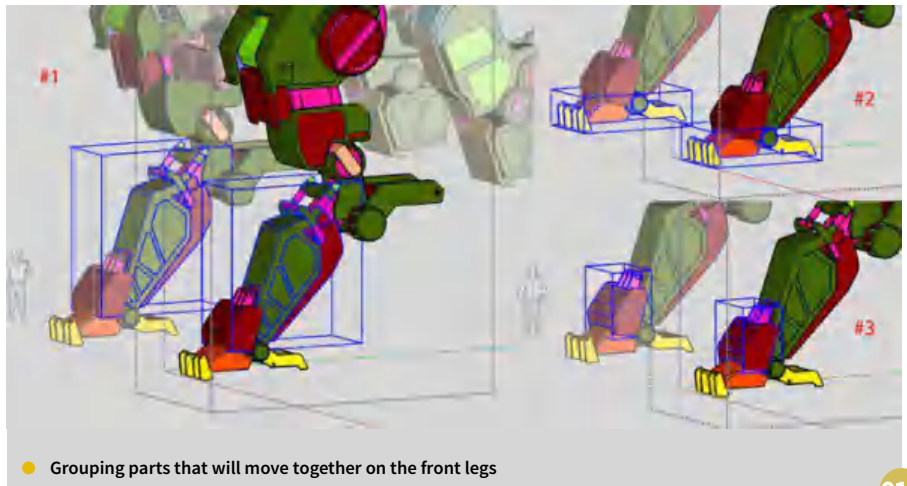
After labeling the IDs, I start to re-group parts in preparation for posing. I group the parts that will move together (fig.01b and fig.01c). However, I still edit within the biggest component, so all the re-grouping will be reflected to the other side.

02 Simple posing: Now I move to pose the mech. I explode the biggest mirrored components, so when I make changes to one side of the body, it won't affect the other side any more, but all the groups I created on both sides before will stay grouped, and I don't have to worry re-grouping them again.

● The model with IDs labeled ready for KeyShot



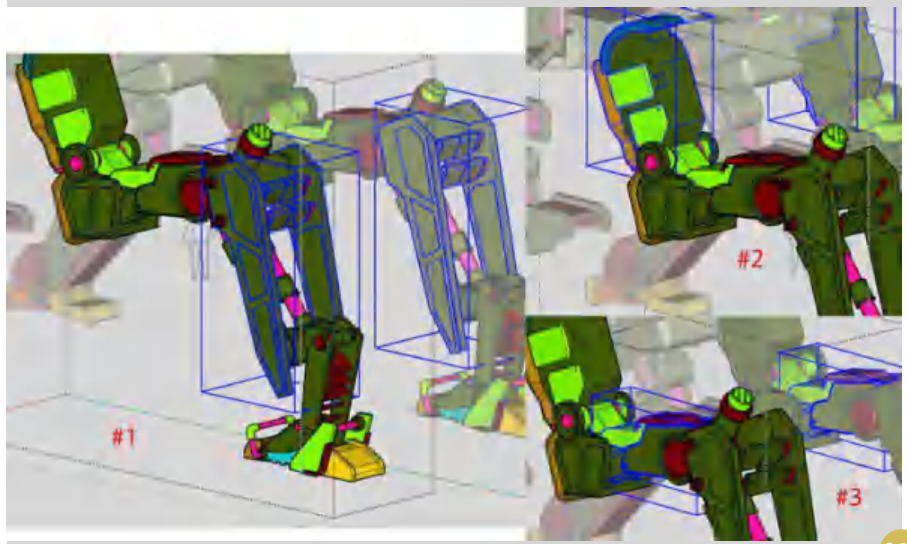
01a



● Grouping parts that will move together on the front legs

01b

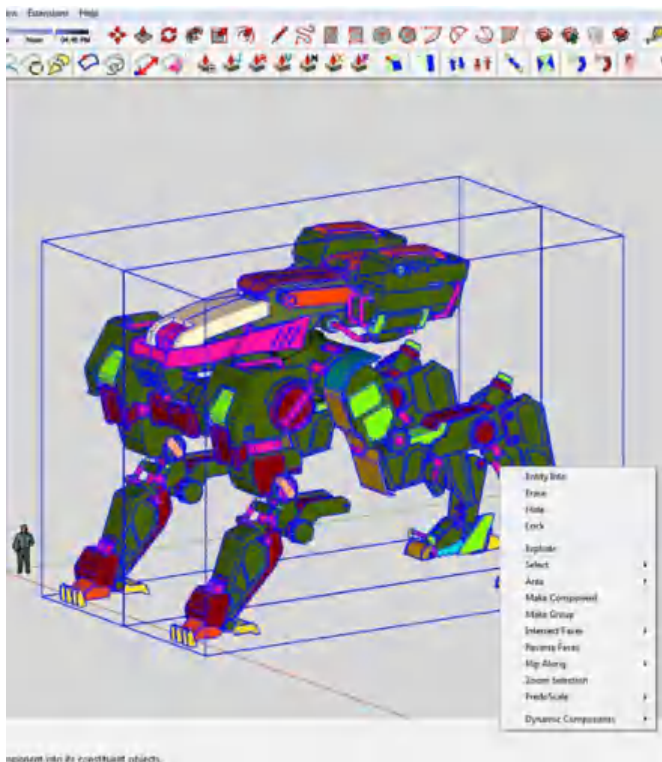
● Grouping parts that will move together on the back legs



01c

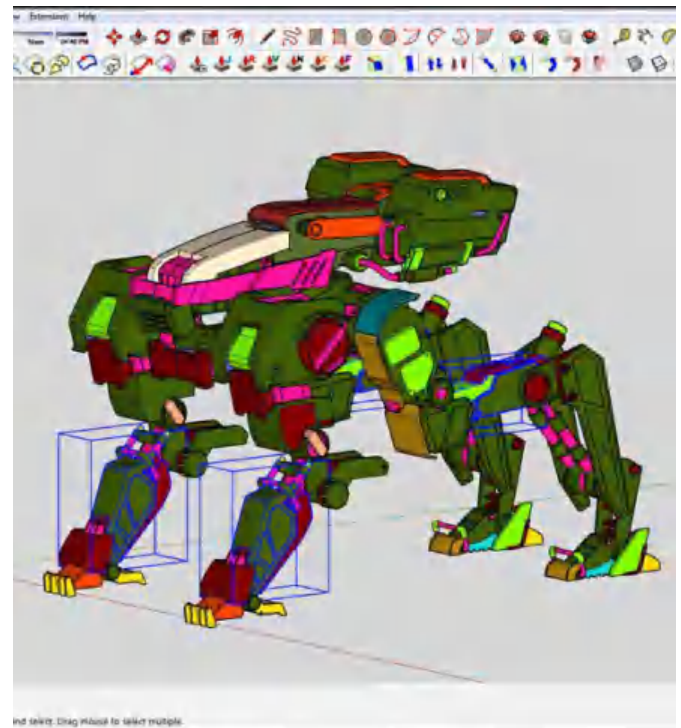
As well as thinking about the biggest feature I want to show on this mech, another consideration when posing is how the camera angle will affect what can be seen and what can't. In this case, the camera angle I plan to have is a three-quarter view. Therefore, I pose the mech's right leg stretching out, and its left leg closer to the body, instead of the opposite. In that way, I can show as much of the design as possible. I also turn the 'head' part a little to the side, as if it's looking around.

03 Adding a background: Since I plan to showcase an entire scene instead of just the mech design, I download props from the 3D Warehouse in SketchUp and set up a background for the scene. As I mentioned previously, I already have a rough idea that it's a small scout mech. I further develop that idea into a police patrol mech that is lightweight with great mobile ability, meant for searching instead of aggressively hunting down targets. This idea inspires me to have some fun and do a background that shows



- Don't forget to Explode the components so they're no longer mirrored

02a



- Luckily, the groups on both sides of the body will stay grouped even after using Explode

02b

an almost propaganda image: a beautiful park scene to show how well-maintained the social order is in the area.

While placing props, I think about the composition of the scene: the foreground with some fences and tree leaves, the middle ground with the mech, and the far background with a bridge. I think about how to use the elements I can find in a park to create an interesting composition and believable environment, e.g. there shouldn't be fences in front of benches, and lamp-posts are very likely near a bench, as well as trash cans. I also use the road path, coming in from the left, as a guiding element to lead the eye to the mech, before the eye is stopped by the tree leaves in the upper-right corner.

04 Cropping image: After I've finished everything in SketchUp, I export the scene as an OBJ file and bring it into KeyShot. The first thing I do is play around with the camera and decide which part of the image I want to include in the final render. The red box marked in the image indicates what will show in the final render. I can adjust the resolution ratio by going to Settings > Resolution Presets. Unless it's necessary, I don't recommend messing around with the original ratio; just make sure to check the Lock Resolution, so even if the ratio of the frame changes, it doesn't affect the resolution of the scene.



- Starting to add a background with SketchUp assets

03

- Cropping the image to our favored composition



04

I play around with the 'Perspective/Focal Length' and 'Field of View' slides here to test out how I want the final image to look (the blue box in the image). After I have decided on the camera

setting, I will click the little lock icon on the camera list in order to lock the camera, so I don't accidentally change anything later (pictured here in purple). ▶

05 Assign materials: I then assign the materials by dragging and dropping the material balls from the library window to the parts where I want the materials to be. The parts that have the same color on the model will all be assigned with the same material.

After assigning materials, I can edit them by going to the Materials tab. The Diffuse color means the local color of the material, and the Specular color means the color of the highlight on the material. I set the Specular color to bright blue to suggest the color of the sky.

06 Label system: Under the Materials tab, there is a sub-tab called 'Labels'. As well as adding labels, I also use it to add stains. I find a free stain texture online and turn down the opacity. Then I add labels and stains by clicking on the plus icon next to the label list. Anywhere on the material, the 'label' will instantly go to where I click. It's really convenient when it comes to stains and weathering effects that are not easily visible. I can duplicate labels by selecting the label on the list, hitting the plus icon again and choosing Duplicate Label.

07 Environment lighting: After I have finished assigning all the materials, I move on to setting up environment lighting which will suit the park scenery better. Instead of using the default HDRI images in the library, I choose to find an image myself because I want one with a blue sky and green trees to reflect the colors of a park onto the model. I go to the Environment tab on the left panel and then click on the icon to the right of the 'Add new folder' icon to import my HDRI image.

After importing the image, I turn to the Environment tab in the project window and start to play around with the sliders to get the result I want. Hold Ctrl and drag with the left mouse button to rotate the HDRI.

Since I already have a modeled background, for the Background option, I choose to use 'Color', and I pick a color that's similar to the sky (pictured in the blue box). The flat color will help me later to quickly mask things out in Photoshop. For the same reason, I check off 'Ground Shadows' under the Environment tab in the project window (purple box), so I can easily mask out the mech's silhouette later in Photoshop.

08 Final rendered images: It is time to render out the images. Since I plan to create scratches and do much post-editing in Photoshop, I render out a couple of images with the exact same camera angle, but with different ►

● Assigning materials as we'd planned earlier



05

● Adding weathering and labels to the mech



06

● Creating environment lighting using an HDRI



07

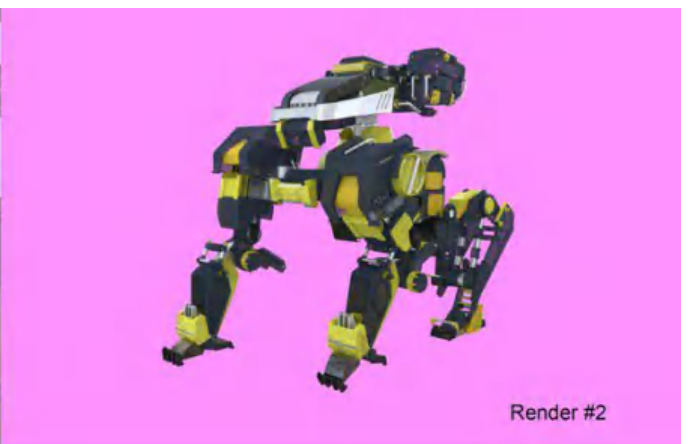


● Rendering out the scene ready for post-editing

08a



Render #1



Render #2



Render #3

Render #4

● Different renders will give more freedom in the compositing process

08b

materials which will be the underlying materials of the cover paint.

I hide any unwanted parts by selecting them and then right-clicking and choosing the Hide Selection option. This speeds up the image rendering time considerably.

09 Texture compositing: When the images are ready, I bring them all into Photoshop. I put masks on all the images that I need, to simply for creating the scratches (see fig.09a, in red). The way I create scratches is by erasing the black mask from the images with textured brushes.

I also start to put in photo textures. The way I select the tricky, irregular shape of trees is with a masking technique. I first click on the 'Edit in Quick Mask Mode' icon in the tool panel (fig.09c, in red), and then I use a white brush to paint in the part that I want to select. After I finish painting, I click on the icon again to change



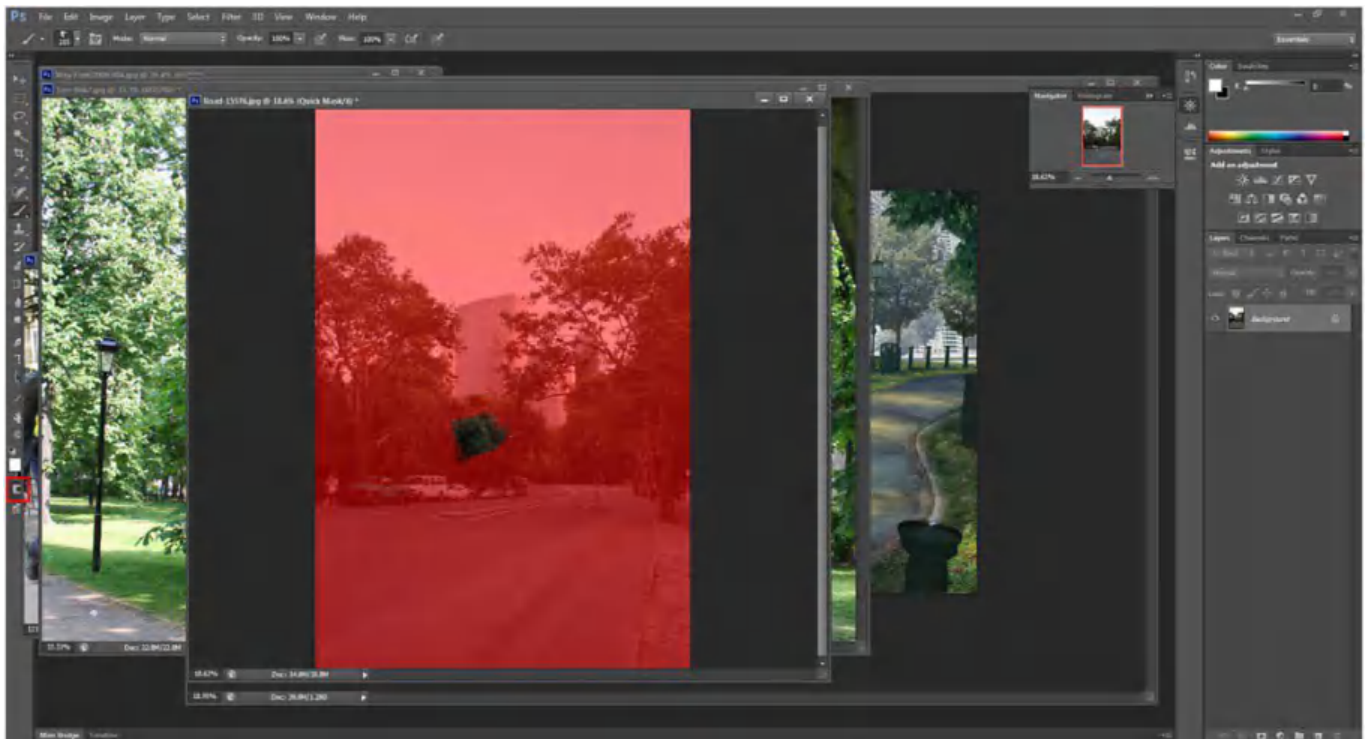
● These masked layers will be used for weathering effects

09a



● Erasing the masks with a textured brush

09b



● Masking the irregular tree shapes

09c



● Choosing an early morning ambient light for the scene

10a

back to normal mode, and the painted part will automatically become the selection.

10 Dramatic lighting: Lighting is one of the most important elements in a composition. I imagine a few lighting situations,

such as dusk, sunny afternoon, twilight, a cloudy day, and eventually settle on a dawn-ish lighting. I think this is when the temperatures of the light and shadow are the most complementary, when the shapes of the shadows are most dramatic, and when there is still some heavy mist in the air.

I add a layer with the blending mode set to Color Dodge, then pick a dark-brown color to fill in the layer. I then add a mask to the layer and start to erase the parts where I want the light to show. I set the light coming from left, to lead the viewer's eye to the mech. ►



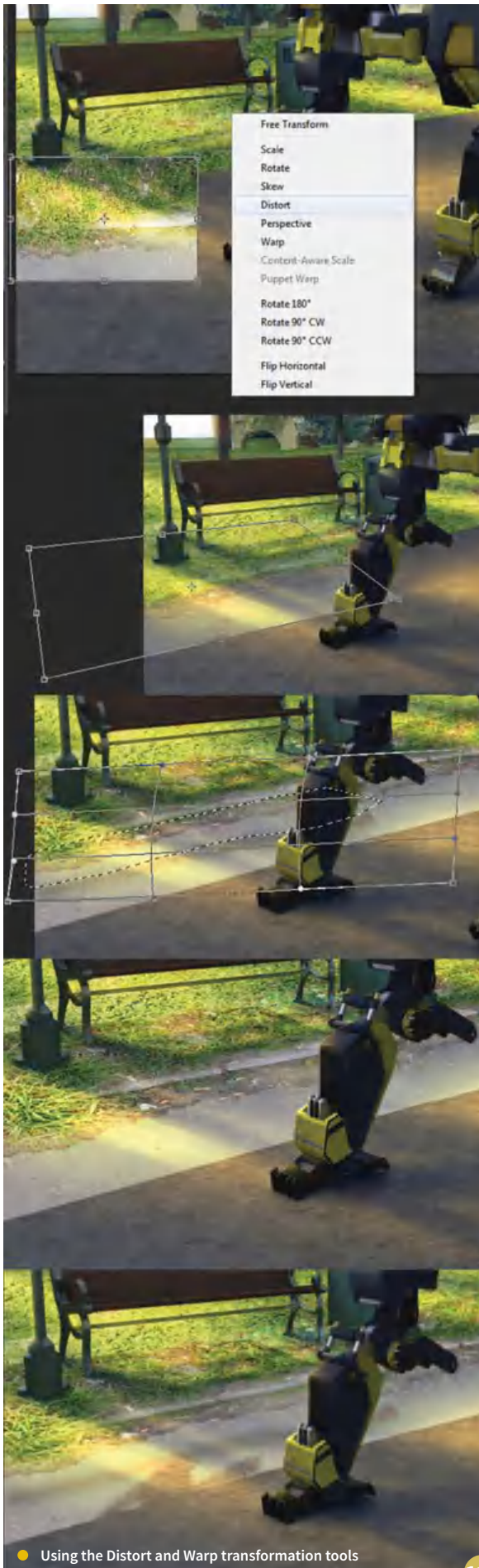
● Adding ambient occlusion style shadows to the scene

10b



● Refining the environment and background

11a



● Using the Distort and Warp transformation tools

11b

I then darken the mech and add in ambient occlusion by adding a layer with the blending mode set to Multiply, and then using the same masking technique as mentioned above.

11 Further compositing: In this step, I start to edit the textures and add details to make them believable. I add a curb along the path. The connection between two objects, be they two mechanical components, a wall and a pipe, or in this case the path and the turf, is the key to believability. Furthermore, I look up some more references and decide to change the path to a more stone-like material. The technique I use here to make the texture match the perspective and shape I want is first by using 'Distort' on the texture, and then 'Warp'. I later erase the parts which I don't want (fig.11b).

In addition to adding more tree textures, I tune down the value contrast and color saturation in the far background. I also pay attention to the diminishing size of the far background trees. Both adjustments are for enhancing depth in the piece.

12 Final touches: I further adjust the value contrast to push the far background even further back, and then I look up more references and find that we usually can only see bushes for the far background, instead of the edge of the park, if we are deep in a huge park. Therefore, I add in bushes to enhance the believability of the scene. Observation of reality is the key of a convincing design, even for a fictional background story.

I also further darken the shadow on the path, and adjust the overall shadow temperature to be much more blue. I paint in some sunlight flare on the edge of the objects that are close and against the direct sunlight. Again, observation of reality helps me to add in tiny but super important details to enhance the believability. Some final cherries which I add are the light glare on the mech, and then some dead leaves on the ground.

Finally, I wrap up the piece by creating a Lens Blur effect to increase depth and make the viewers see the focal point first. In order to do that, I copy and paste the entire image onto a new layer, and then use the Gaussian Blur filter. I then put a mask onto the blurred image, and erase the parts which I don't want to be blurred. ●



11c



The Artist



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FREE RESOURCES

Scene file

Image planes



Model a steampunk spaceship in Maya

by Rory Björkman

Improve your Maya hard-surface designs with Rory Björkman, as he crafts a detailed spaceship design ready for texturing in MARI [▶](#)

The Artist



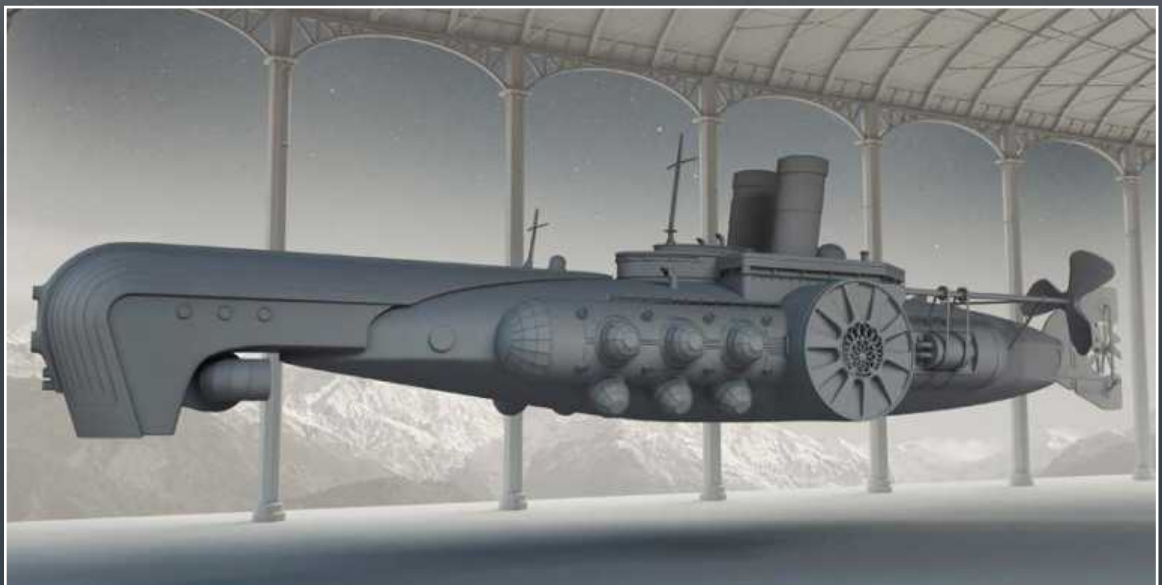
Rory Björkman

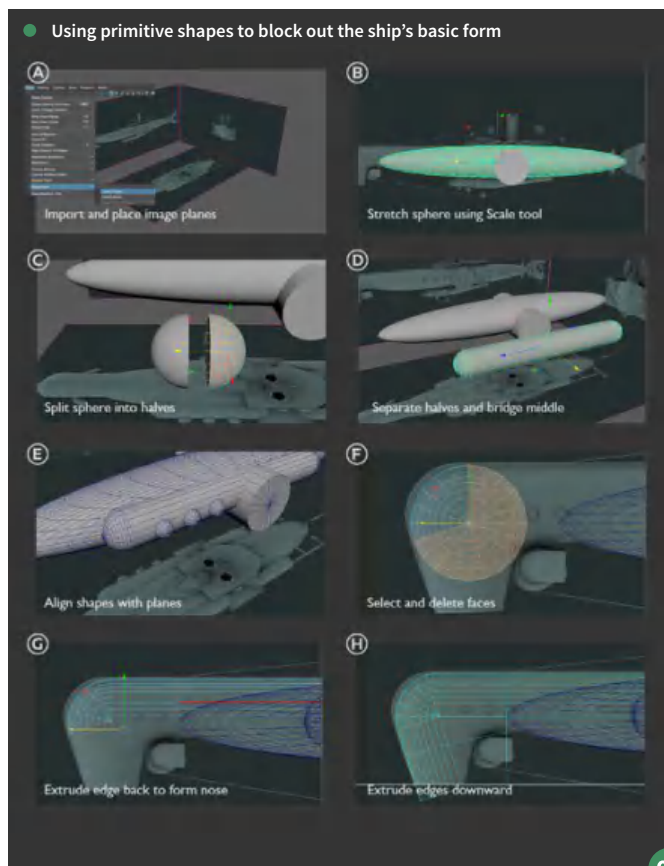
artstation.com/artist/bjorkman

Software Used:

Maya

With a background in traditional art and sculpture, Rory Björkman is currently studying Media at the National College of Art and Design in Dublin, with a focus on digital arts.





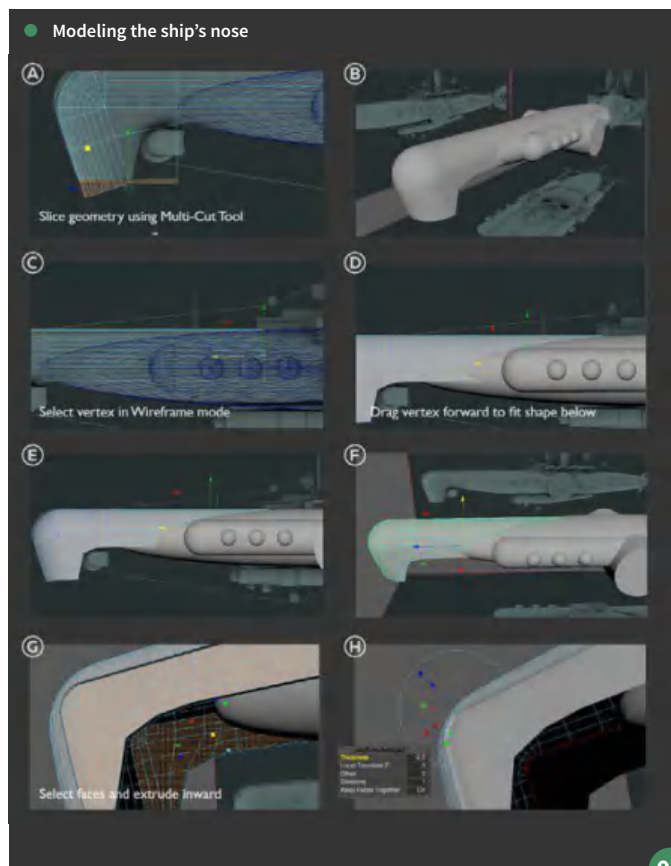
Learn some Maya modeling tricks from Rory Björkman...

In this tutorial we'll look at creating an ornate steampunk-style airship using Maya modeling techniques. An intermediate working knowledge of Maya is recommended, though the complete model is included with the downloadable resources for you to look at. At the end, we should have a fully modeled ship, ready for texturing in MARI next time.

01 Blocking in the main forms: I've prepared a set of orthographic images we can use as a rough guide for the shape of our airship. Import them via View > Image Plane > Import Image. Next import some basic shapes from the Create Polygons menu and using the Scale and Move tools to drag and move them into place using the orthographic images as a guide.

To split geometry (C), select the faces you want to separate and go to Edit Mesh > Face > Extract. Then move the segments apart, select both pieces under Mesh > Combine. To bridge the gap (D), select the edges of both hemispheres and go to Edit Mesh > Bridge.

To make the rounded nose of the ship (F), create a sphere and delete the unwanted faces. Select the edges and under Edit Mesh > Extrude, drag the edges along the length of the nose.

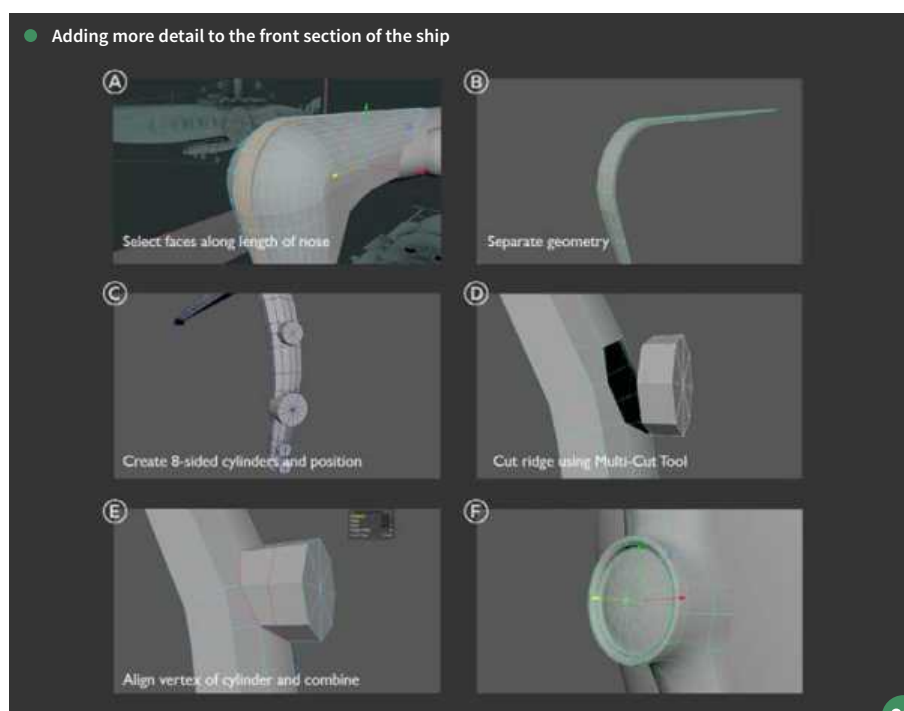


02 Making the nose of the ship: To clean up the front of the nose (A), I will use the Multi-Cut tool under the Mesh Tools menu. To cut in a straight line, press Shift, then click and drag the tool in the direction of the cut line you want to make. Then select and delete excess faces.

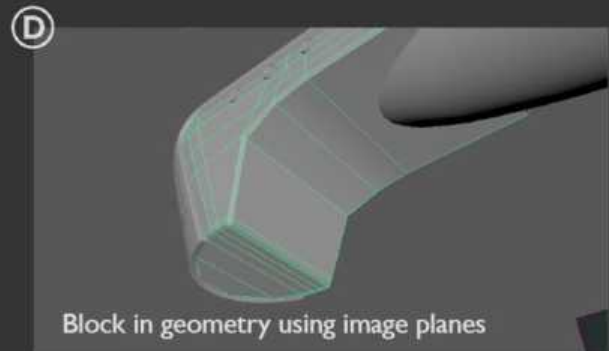
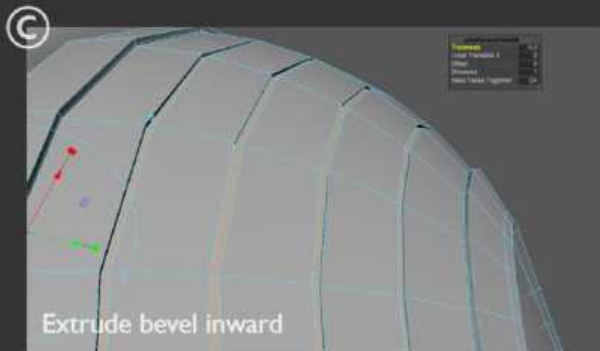
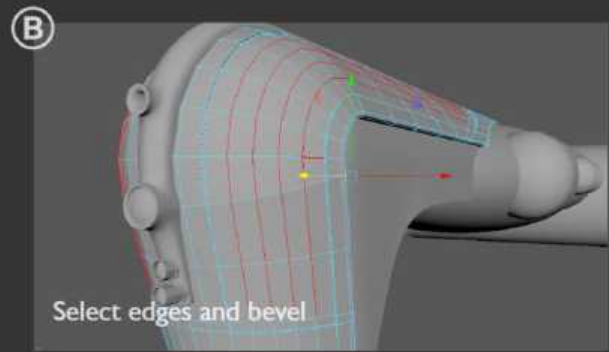
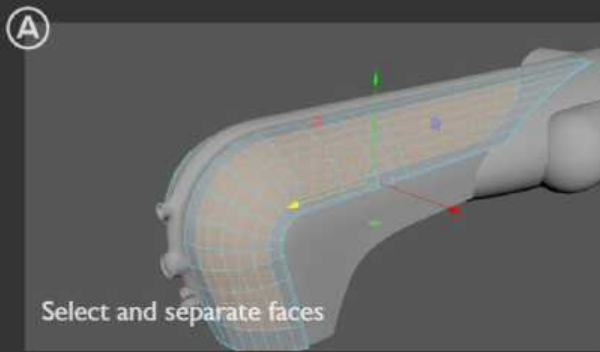
Now access Wireframe mode (C), select the vertex and drag to fit the shape of the hull. Press 5 to

revert to Shaded mode so we can see how they fit. To create some more interesting shapes to the nose (G), select the side faces and using the Extrude tool adjust the thickness inward just a little to form a step.

03 Detailing the front: To make a nice ridge along the front we can use the existing geometry. Select the faces that run along

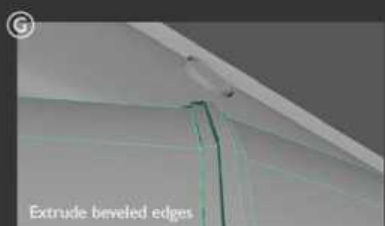
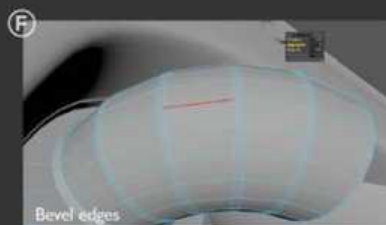
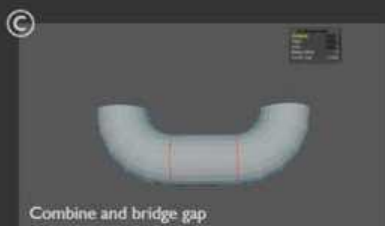
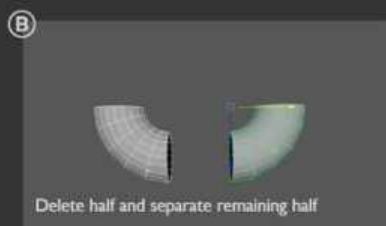
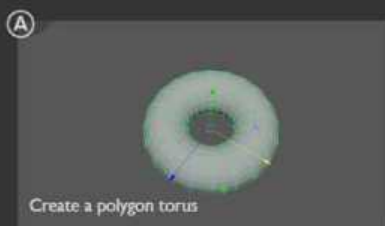


● Adding grooved panel details to the ship's nose



04

● Creating the airship's front thrusters



the center and extrude them outward. Select these extruded faces and go to Edit Mesh > Face > Extract to isolate the ridge.

Next create a cylinder with eight sides (C) and position it in the center of the ridge. Use the cylinder as a guide (D) to cut the geometry of the ridge using the Multi-Cut tool. Then combine the two pieces of geometry and align the cylinder to meet the hole made in the ridge. To connect the vertices of the cylinder and ridge, right-click and engage Vertex mode. Select all vertices and go to Edit Mesh > Merge.

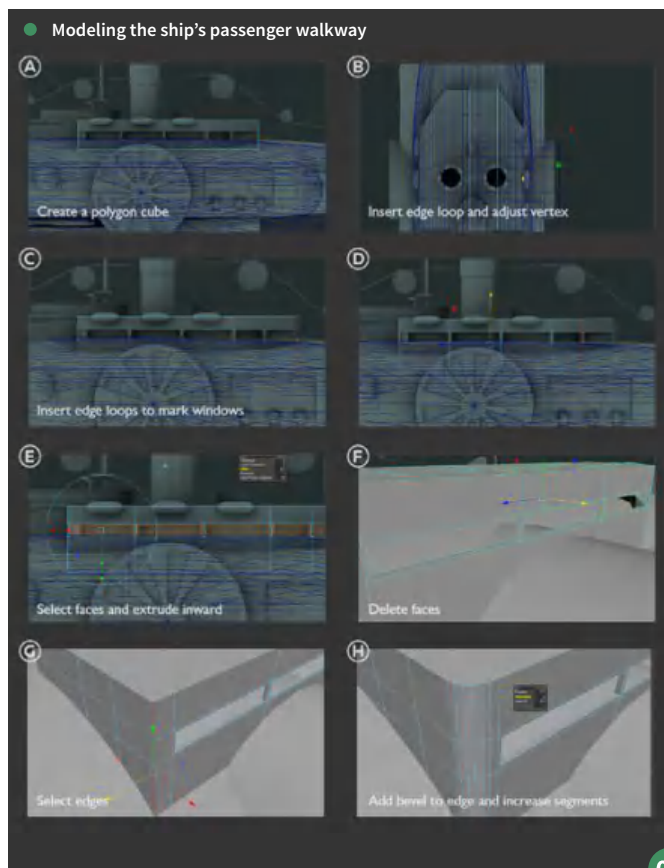
04 Creating grooved panels on the front:

Let's start by selecting the faces on the front, leaving a border. Then go to Edit Mesh > Face > Extract to separate these panels. Then select the edges inside our panel and go to Edit Mesh > Bevel to split the edge lines (B).

Select the beveled edge faces and extrude those inward to make a small set of valleys (C). To make smooth edges more rigid, we can add edge loops using Mesh > Insert Edge Loop. By dragging edge loops close to the edge of a corner this will support the shape when smoothed.

05 Front elevation thrusters: Next create a polygon primitive torus and delete half, then split the remaining half into two pieces and create some distance. Then Mesh > Combine the two pieces and then go to Edit Mesh > Bridge ►

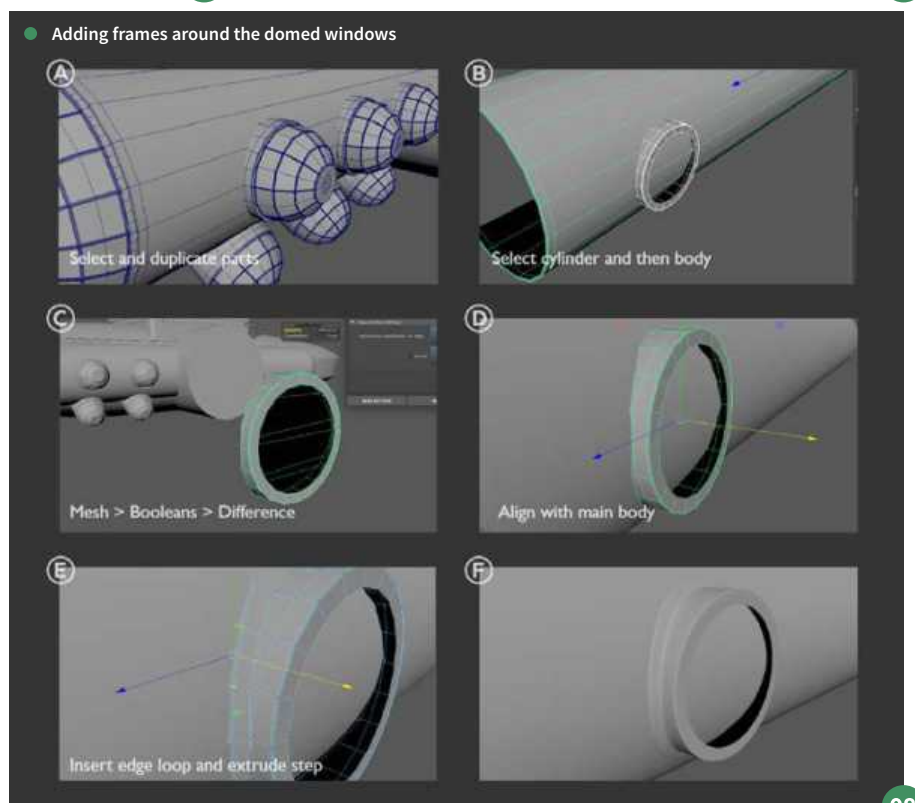
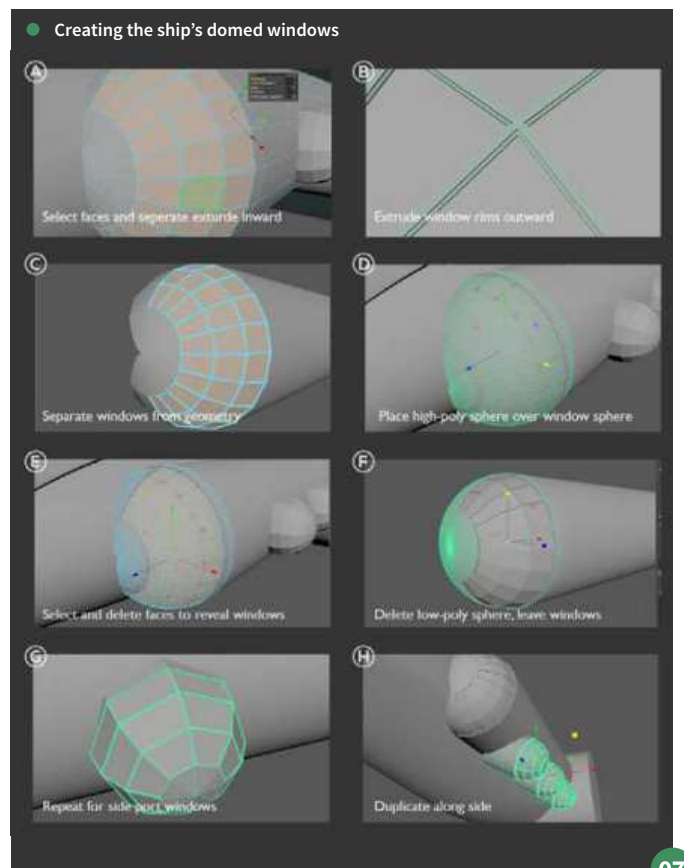
05



to join the parts. To make the bend look as if it is made of panels, select the edges and create a bevel of three segments. By extruding the three segments first and then just the center, we can make a stepped ridge (G). Last just add some edge loops at the corners to tighten the geometry when smoothed.

06 Passenger walkway: To create the passenger deck, first move to the side view and create a polygon cube. By flipping from side to top we can adjust the cube to fit the images roughly. Now select the window faces and select Extrude under the mesh menu. Before you extrude, make sure Keep Faces Together is turned off in the extrude options. Then adjust the offset to make a window frame and press extrude again to push the thickness of the windows inward (E). By selecting the edges, we can add a bevel and increase the number of segments to make a nice rounded corner (H).

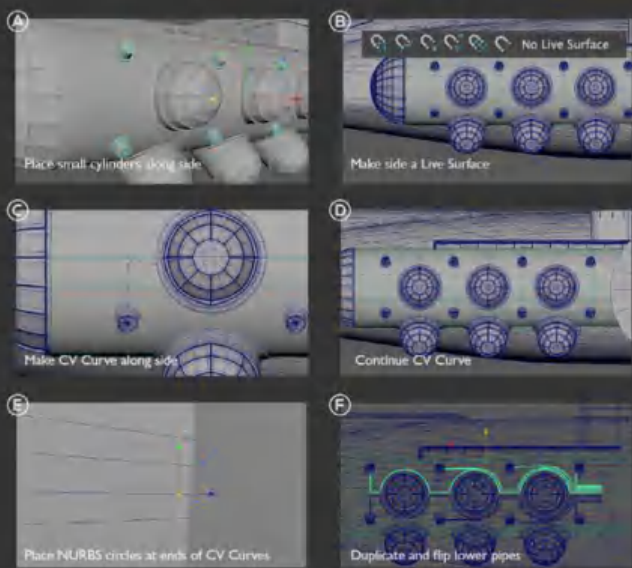
07 Windows: For creating the windows we first need to select the faces and turn Keep Faces Together off so the faces extrude individually. First extrude the Offset to make a frame and then extrude the thickness to create depth. Next we need to separate the windows and frame and delete the rest of the sphere (C). Then replace this sphere with a new sphere and ramp up the subdivision Axis and Height in the Attribute Editor with the sphere selected.



08 Creating window rims: This part is tricky. First duplicate your window cylinder and body (Ctrl+D), then drag it aside. Then Shift-select the cylinder and then the body (B) and let's perform a Boolean operation. Go to Mesh > Booleans and adjust to Difference. This

should leave the cylinder behind. Delete the middle faces leaving just a ring. Align this ring to the original body and add an edge loop along the body so we can extrude a step to form a rim (F). You can select the vertex to tweak the rim in order to fit it neatly around the body shape.

● Adding pipes to the side of the ship



09

09 Adding pipes on the side: Now we'll place cylinders which will become vents along the ship's side. Then by selecting the side we can make it a 'live surface'. (At the top you will see a magnet icon – press this and your selected geometry will become live.) Now select the CV Curve tool under Create > Curve Tools > Create CV Curve. Click and draw where we want our pipes to go on the live surface. At the end of the CV Curves, place a NURBS circle. Next select the circle and then the curve, and under the Surface menu click Extrude.

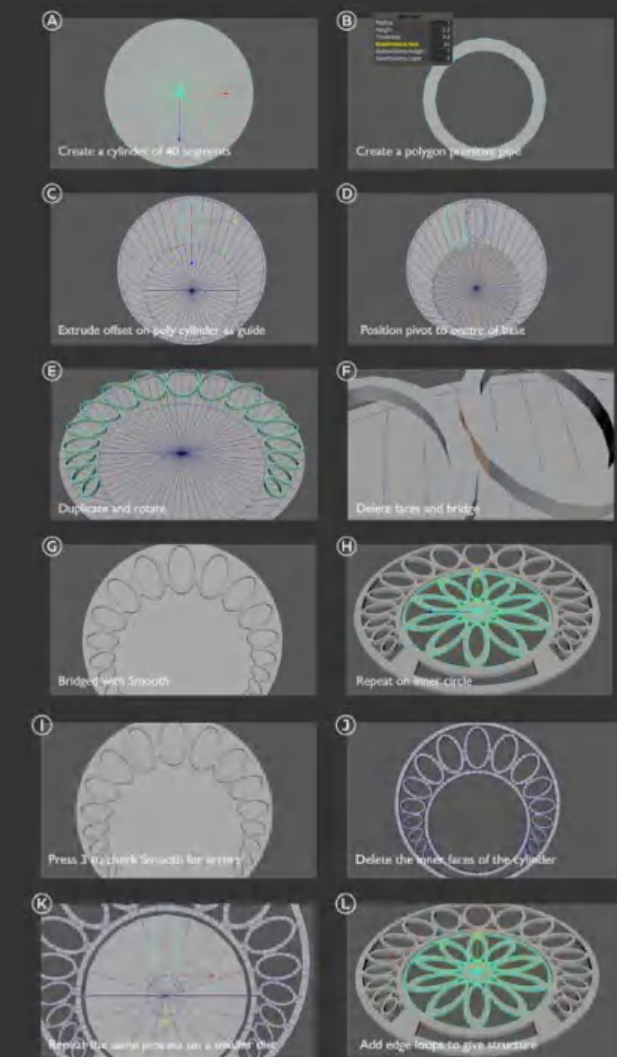
Next, convert the tube into polygons by selecting the tube and going to Modify > Convert > NURBS to Polygons. Select the advanced menu and set the count to 5,000 or less depending on the size of the tube. After conversion, the NURBS tube will remain, so this can be deleted now, leaving us with a polygon tube.

10 Modeling ornate engine detail: Create a flat cylinder and extrude an offset inward, then move the center down (D). Then create a polygon primitive pipe and use the Scale tool to stretch the shape oval. To repeat the circular shape in an arc, we need to adjust the pivot point. Select the oval, then press and hold the 'D' key to move the pivot point to the center of the cylinder. By pressing Shift+D you can duplicate the oval and move it slightly left or right. To graduate the size just use the Scale tool.

Now select the faces of the ovals facing each other and delete them. Then select both oval shapes and combine them (F). After they're combined we need to select the edges of the holes we just made and use the Bridge tool to connect the two pieces. The Bridge tool is under the Mesh menu, and you may need to adjust its offset if it looks wrong. Repeat this process all around and again on the bottom insert.

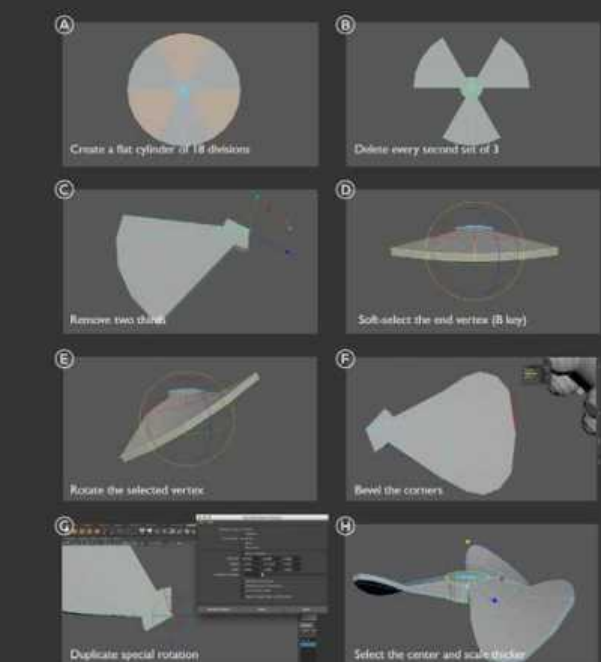
11 Making a propeller: To start the propeller, create a cylinder with 18 divisions and delete every second set of three faces (B). Then delete two thirds and soft-select the end vertex. Soft selection can be adjusted by holding 'B' and sliding the mouse. Bevel the corners (F). To evenly rotate the pieces we can use the Duplicate Special under the Edit Menu. Select the advanced tab and set the Y rotation to 120 degrees with copy enabled. Apply this twice, then combine the three parts and merge the vertex by selecting Edit Mesh > Merge. ▶

● Creating a decorative



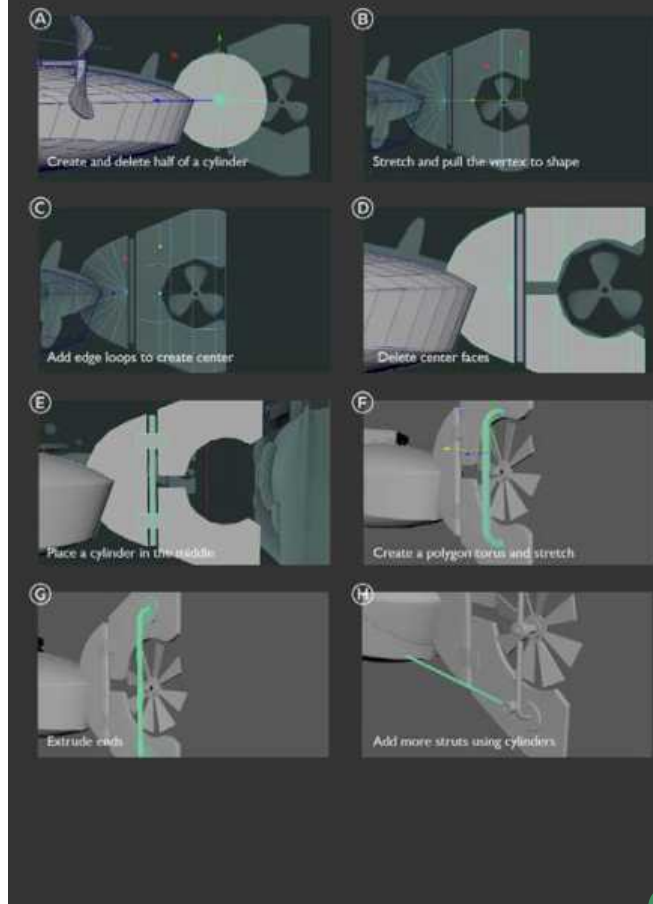
10

● Creating the ship's propeller



11

Creating the airship's rudder from a cylinder

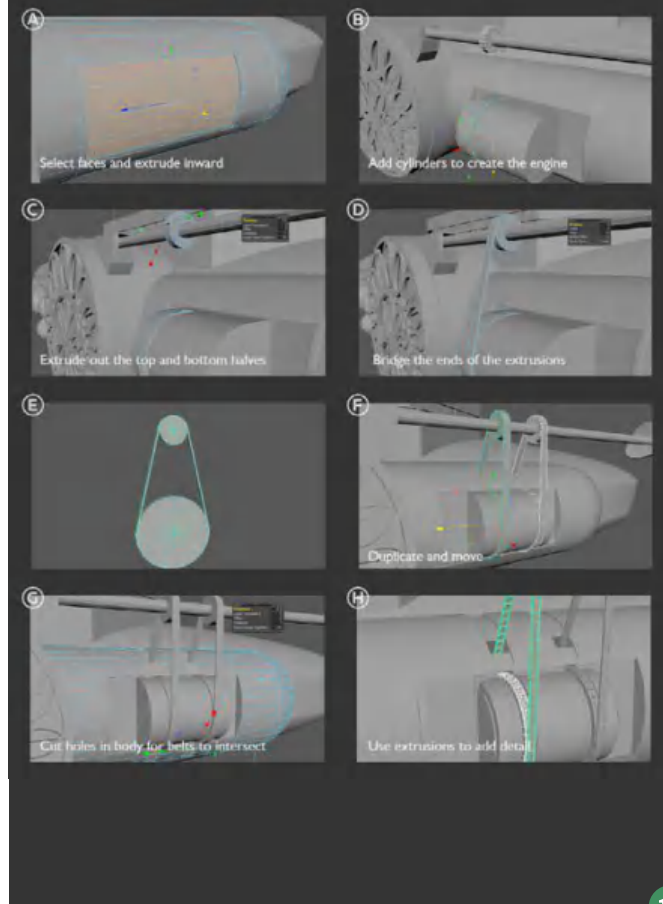


12

12 Building the rear rudder: Next we need to make a cylinder and delete half, then stretch out the end to make the shape of the rudder. By adding edge loops we can manipulate the vertices to create the center hole (C). To create the beams (F), we first need to make a polygon torus and delete half. Then select the vertex of the top and pull it up making a long tube with cornered ends. The strut's round bases (G) can be made by adding an edge loop and extruding out a thin step.

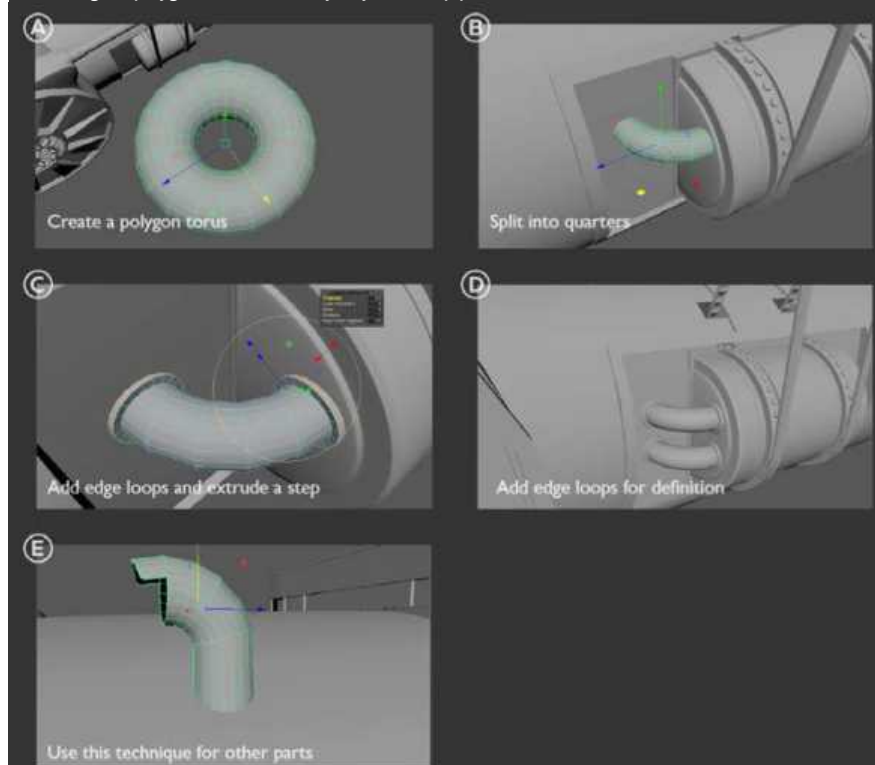
13 Building the engine: First let's extrude in some faces to enable us to place the engine (A), then make a small and large cylinder (B). Combine them and extrude the top-half faces and the bottom-half faces outward (C). Delete the end faces of the extrusion and bridge the ends to make up the belt (D). Then duplicate the belts using Shift+D and cut holes in the main body for the belts to pass through. To do this, add edge loops and select the face and extrude them inward. To add more detail, you can select the faces of the cog and belt and extrude the faces with 'Keep faces together' turned off in the Extrusion menu (H).

Modeling the ship's engine with cogs and belts



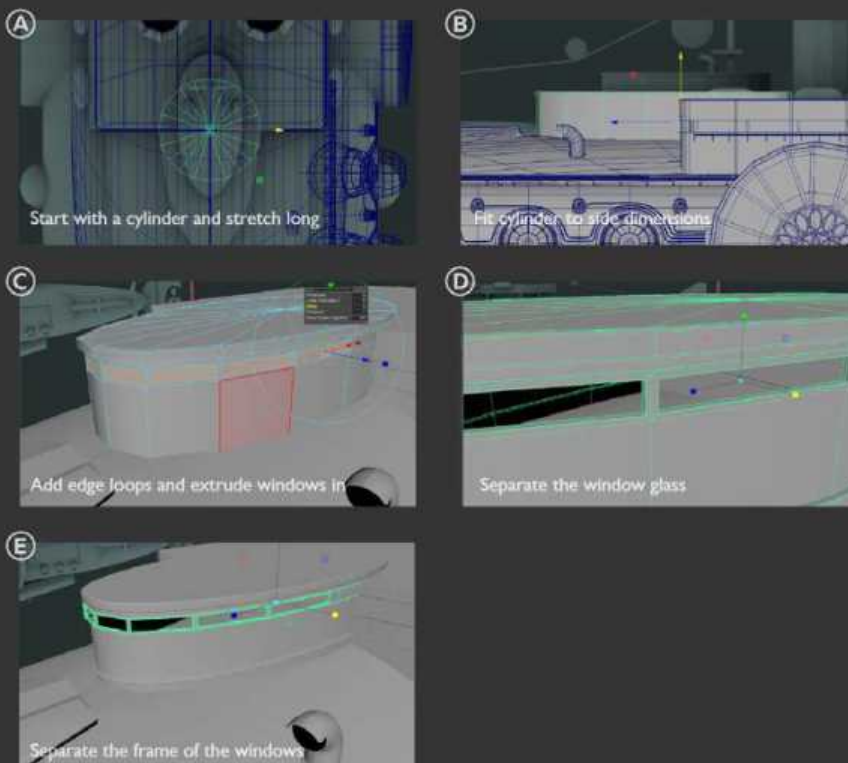
13

Using the polygon torus as a handy way to make pipes

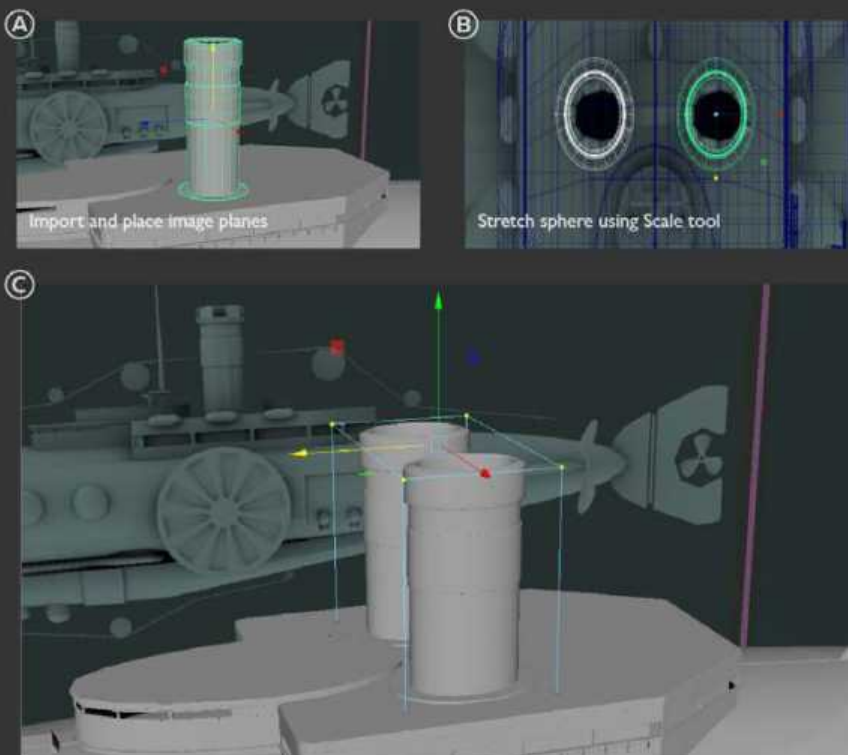


14

Modeling the ship's control room



Adding the airship's chimneys



14 Adding engine pipe details: A quick way to make a bent pipe is to make a polygon torus and delete all but one quarter. We can extrude the ends if we need to add length and add an edge loop to extrude a step out. Add more edge loops at the corners to tighten the mesh when smoothed. We can use this technique to place pipes and vents around the ship.

15 The captain's control room: Using the image planes lets go to the top view and make a cylinder, use the Scale tool to stretch the shape. We can add edge loops to make the window faces (C). Then extrude an offset inward with 'Keep faces together' turned off. Separate the window faces. We can also separate the window frames and add some edge loops at the corners to retain the shape when it is smoothed.

16 The chimneys: To make the chimneys we can start with a polygon pipe shape and lengthen it using the image planes as a guide. By adding some edge loops and extrusions we can form some ridges and interest to the design.

When you are happy combine the two chimneys and under the Deform menu select the lattice tool. With the lattice selected, right-click and select the 'Lattice Point', these are like vertex. With these selected you can move the entire shapes backwards. To remove the lattice and bake the shape, select the chimneys and under the Edit menu select Delete by Type > History – this should remove the lattice and the shape will remain. ●

The Artist



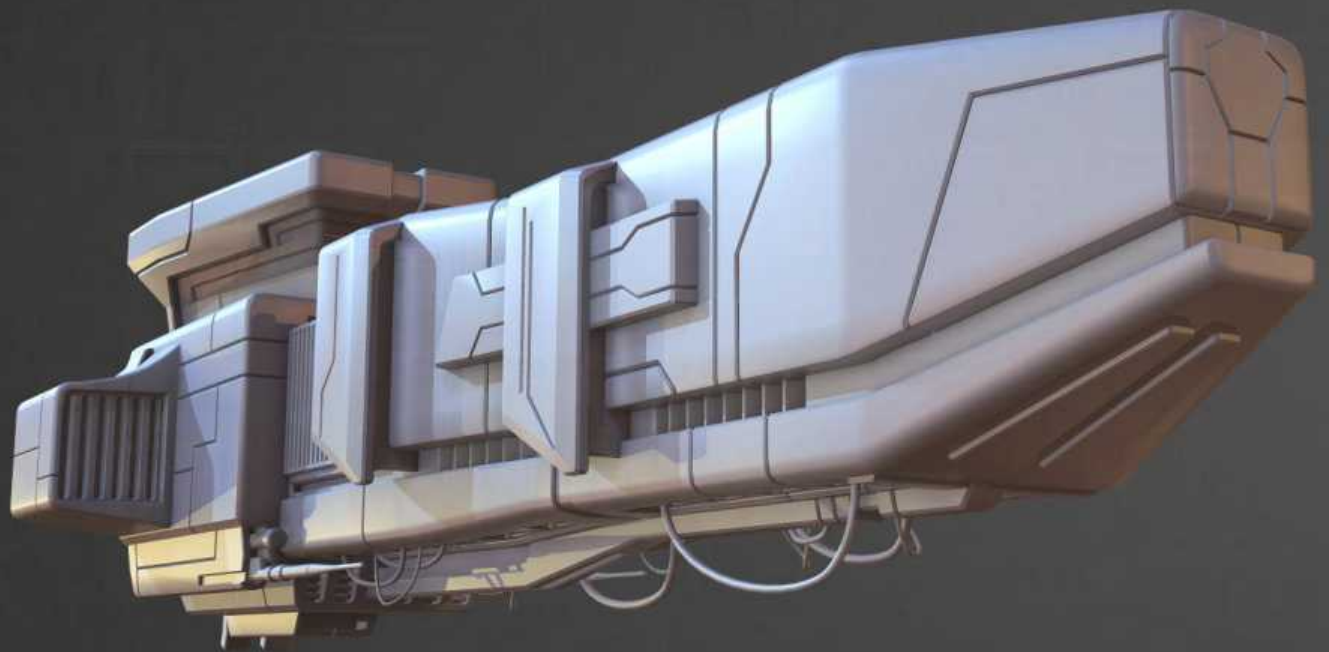
Rory Björkman
artstation.com/artist/bjorkman

NEXT ISSUE
Learn how
Rory Björkman tackles
texturing in MARI



FREE RESOURCES

Scene file

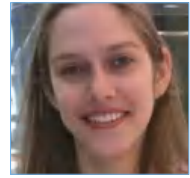


Sci-fi aircraft in 3ds Max

by Victoria Passariello

Join the talented Victoria Passariello as she creates this sci-fi cargo ship, from a simple block-out to an optimized model ready for texturing [▶](#)

The Artist



Victoria Passariello

vitru3d.com

Software Used:

3ds Max

Victoria Passariello creates hard-surface models because she loves robots and 3D. She works at Perihelion Interactive making ships for sci-fi videogame *The Mandate*.



Develop your 3ds Max sci-fi modeling skills...

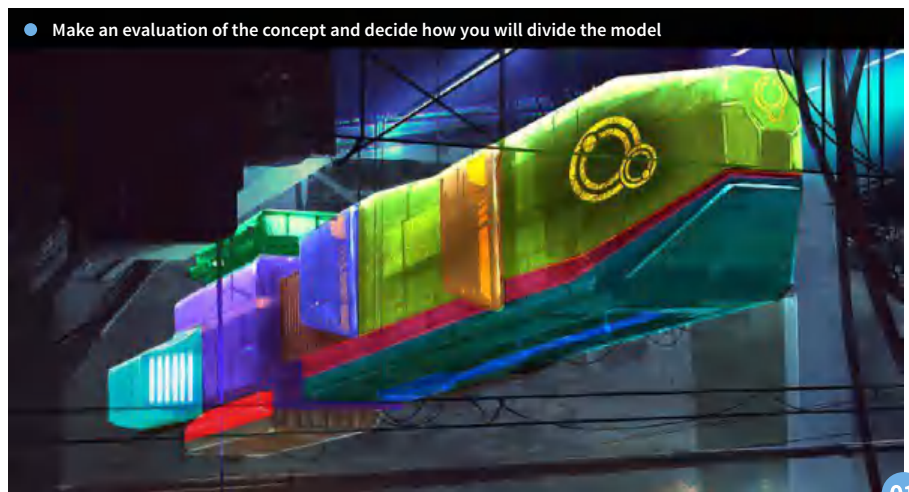
In this first part of this tutorial I'm going to show you how I made a sci-fi spaceship based on a concept by Markus Lovadina. I've been working on ship models for about one year now, so I'm going to share my techniques to approaching different pieces of a model. I'm going to share how I made the panels and cut-lines, basically only using edge loops and edge extrusions. I will also show you the way I make final chamfers on the borders of the models to give them a more detailed finish. Finally, I will show how I optimize the mesh once the model is done. I hope that my tricks and methods will be helpful for all of you, and worthy to be used in your own models.

01 Evaluate the concept: Before starting any modeling, we need to see the concept in detail and evaluate every object and piece we see on it. It will be very helpful if we make a breakdown of the whole object and divide it into different sections. Each one of these sections will be a single mesh in the future 3D model. It is possible that each section has sub-objects, but the important thing now is to have a clear vision of the main shapes we will work on. In the image you can see how I interpret the concept and how I separate the different pieces.

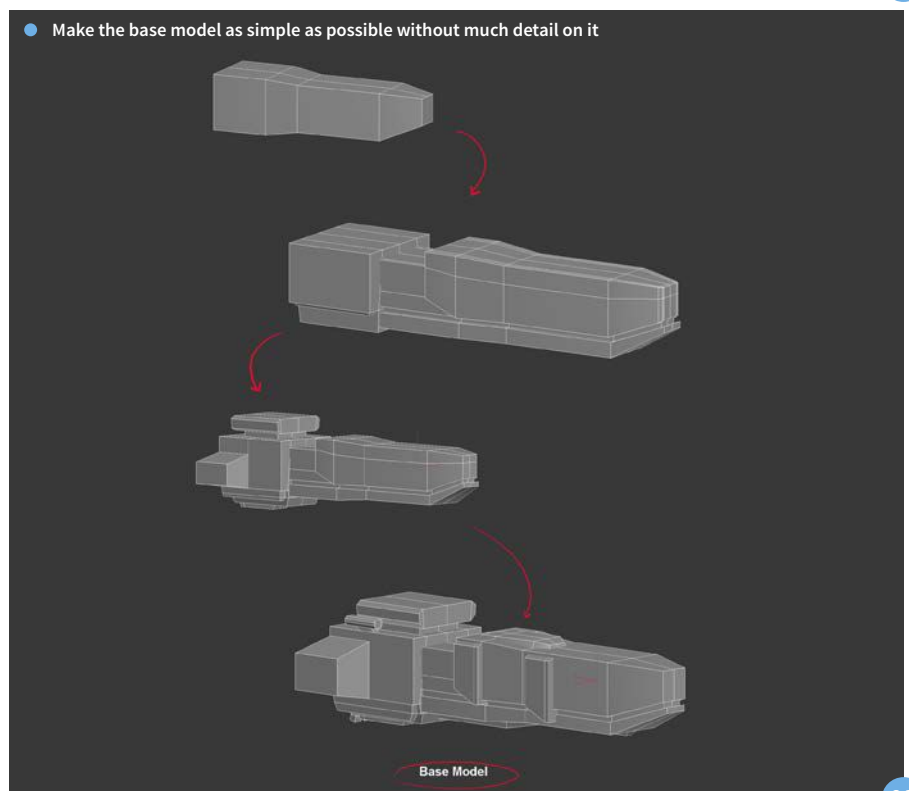
02 Base model: I've provided you with the base mesh for this model (**ship_baseMesh.obj**) so you can start with it and continue with the rest of the steps. The object is in half, so you should apply a Symmetry modifier to work with it. As you can see, it is a very rough and simple model, created by making simple boxes, adding edge loops and bevels, and scaling polygons to make the base shapes as close to the concept as possible. Of course, all of the proportions I'm suggesting here may change in the future, but if we start with the right proportions before starting to add any detail, it's a better beginning. Notice that I also make each object based on the separations I previously made in the concept.

03 Edit geometry and constraints: I'm going to talk about this particular option right now because I use it a lot and I'm going to mention it a few times in this tutorial. It's a very useful feature that most of the time is forgotten.

In any sub-selection mode of an editable poly, under the Edit Geometry rollout you will find the Constraints option. This option allows you to move, rotate or scale any sub-object selection (vertex, edge, polygon), restricting the

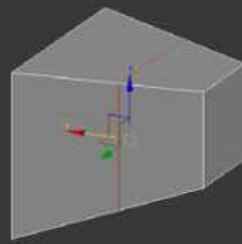


01

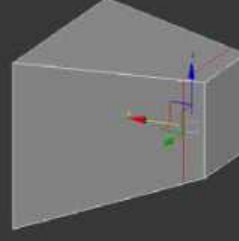
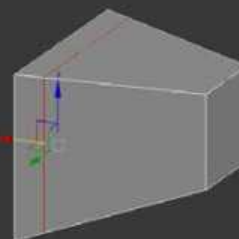
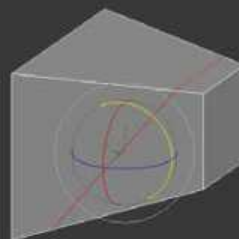
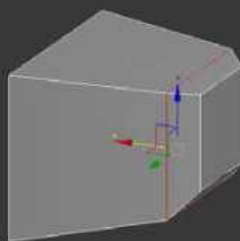
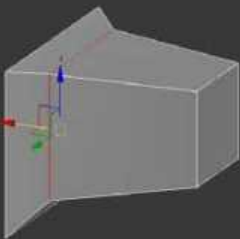
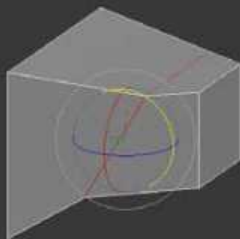


02

- Use Constraints to move, rotate or scale sub-objects by restricting the transformation to edges, faces or normals



Original Loop

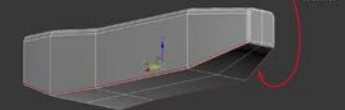
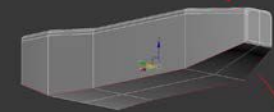
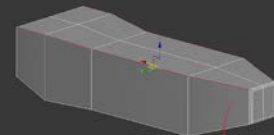
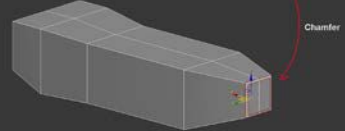
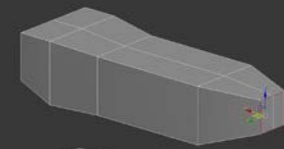


03

transformation to the selected constraints (edge, face, normal). For example, if you want to move a vertex or edge that belongs to a leaning polygon, you can select Edge Constraint to restrict the transformations to the edge boundaries. See the image for a simple example.

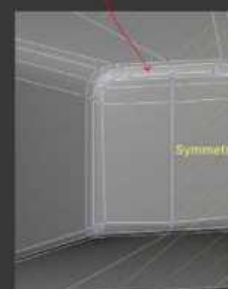
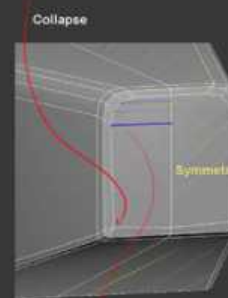
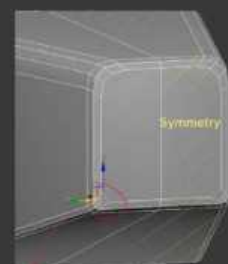
04 **Modeling the front section of the ship:** We can see in the concept that the big pieces of the ship have very smooth edges, so this is the first thing I make. I select the front edge and apply a small chamfer of 2 segments.

- Making chamfers to give the smooth look we see in the concept



04a

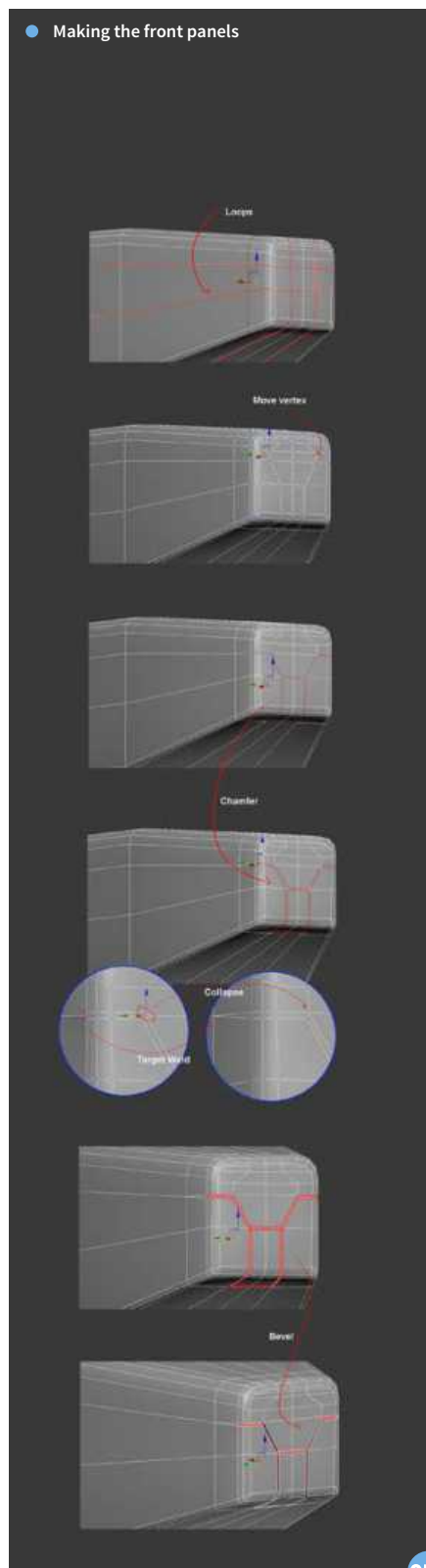
- Collapse and connect vertices when needed



04b

I do the same with the edges in the bottom. For the edges on the top, I make a bigger chamfer of 3 segments because I see in the concept that the top edges of the ship are smoother than the ones on the bottom (04a). After making all the chamfers I collapse some unnecessary vertices and connect some others as shown (04b). Always remember to check all the edge loops after applying a chamfer or extrude, and collapse or connect any vertex where needed. Don't forget to check the back of the object using the exact same process as before. ▶

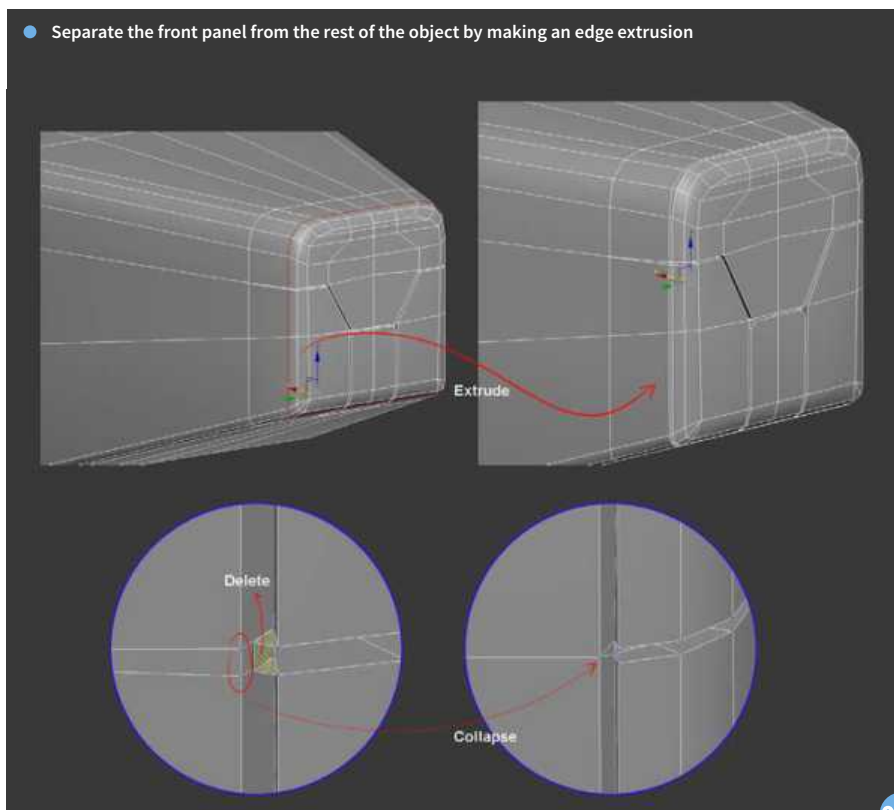
- Making the front panels



05a

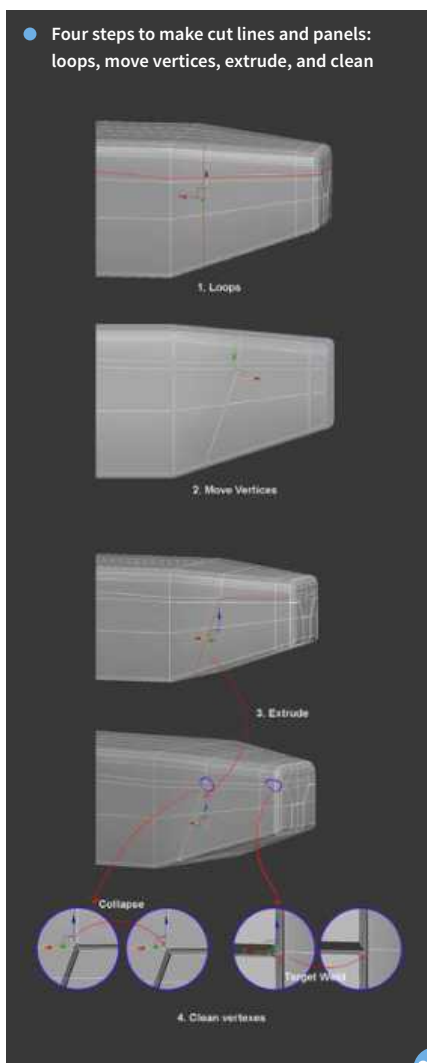
05 **Creating cut-lines and panels:** Let's move on with the front panels. I make some loops to get the lines I need, then I move some vertices to make the desired shape of the panels. Once I have the shape I want, I select the corresponding edges and make a small chamfer (time here to go and clean some vertices). After that, I select the resulting polygons and make a bevel inwards (05a). Finally, to separate these

- Separate the front panel from the rest of the object by making an edge extrusion



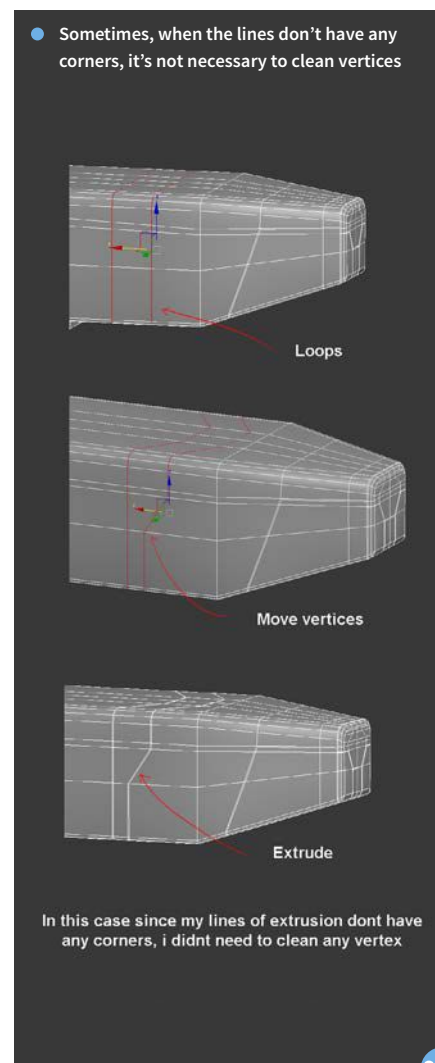
05b

- Four steps to make cut lines and panels: loops, move vertices, extrude, and clean



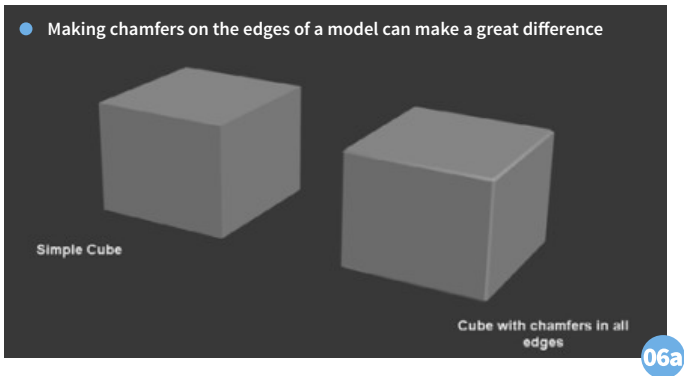
05c

- Sometimes, when the lines don't have any corners, it's not necessary to clean vertices

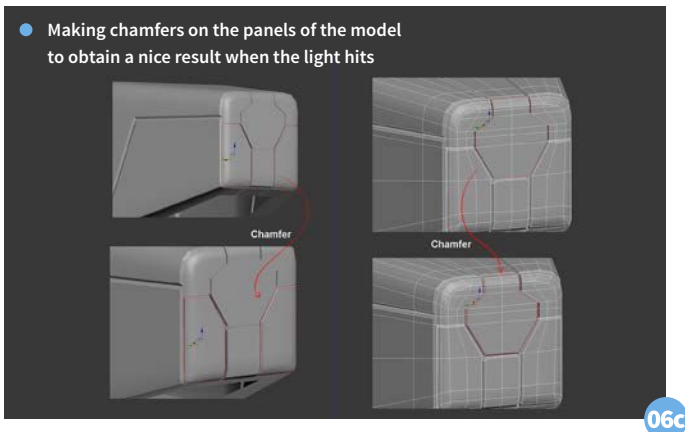


05d

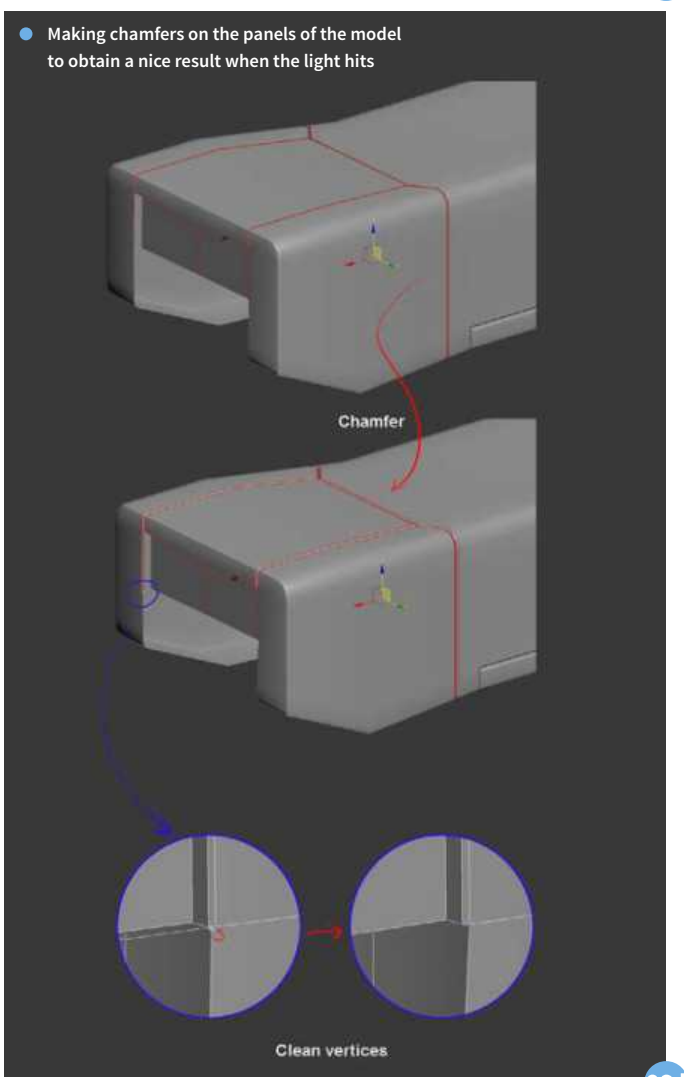
- Making chamfers on the edges of a model can make a great difference



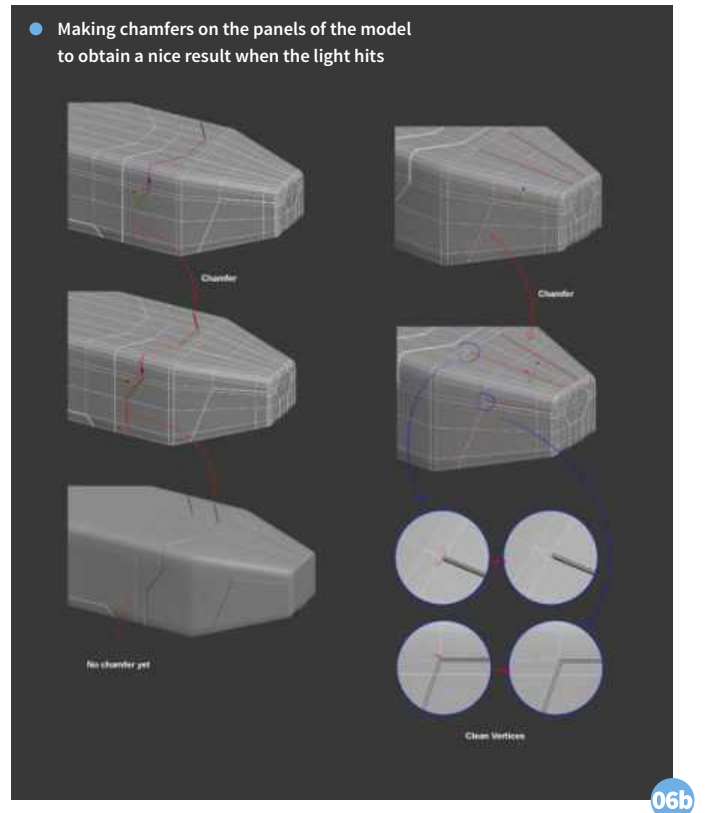
- Making chamfers on the panels of the model to obtain a nice result when the light hits



- Making chamfers on the panels of the model to obtain a nice result when the light hits



- Making chamfers on the panels of the model to obtain a nice result when the light hits



new panels from the rest of the object, I select one of the front loops and applied an extrude. I clean some vertices again (05b).

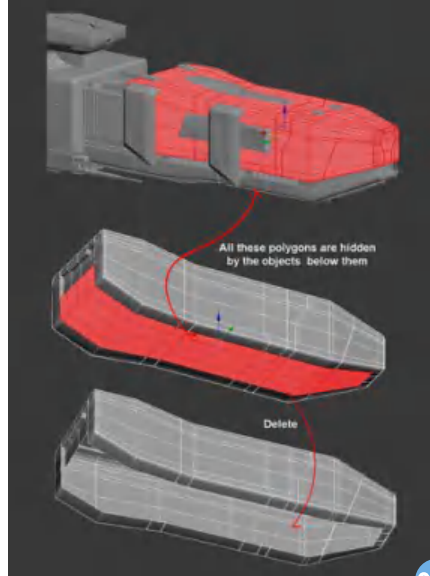
To make the cut-lines, I basically always make loops here and there when needed, and move the vertices to get the desired shapes. In this process of moving vertices around you may want to use some Constraints to get a better result. So, once I have the desired shapes, I select the corresponding edges and make an extrude. The final step is to always have a look all around the loops to see if there are any unwanted vertices to collapse and delete. Don't be worried about the polygon count, as we will delete all the unnecessary edges later on anyway (05c).

Knowing that, we can say that the formula to make cut-lines and panels is: make loops, move vertices to get the desired shapes, select edges and extrude, then clean extra vertices. Keep in mind that in some cases, when the lines you want to extrude don't have any corners, you won't need to clean the vertices (05d).

06 Making the detail pass: This is what I call the detail pass on a model. Here I make chamfers all around the edges of panels, surfaces and other pieces once all the initial modeling is done. This way, when the model is put into a scene, the light will bounce in a nice way and will give a better-looking result. See a small example of how the chamfers can make a big difference in a model (06a). Of course, making these chamfers will considerably raise your poly-count, so it is important that you always keep in mind your poly budget and be smart about where to use them or where not to – usually in the big and main pieces of the model, the ones that will be more visible.

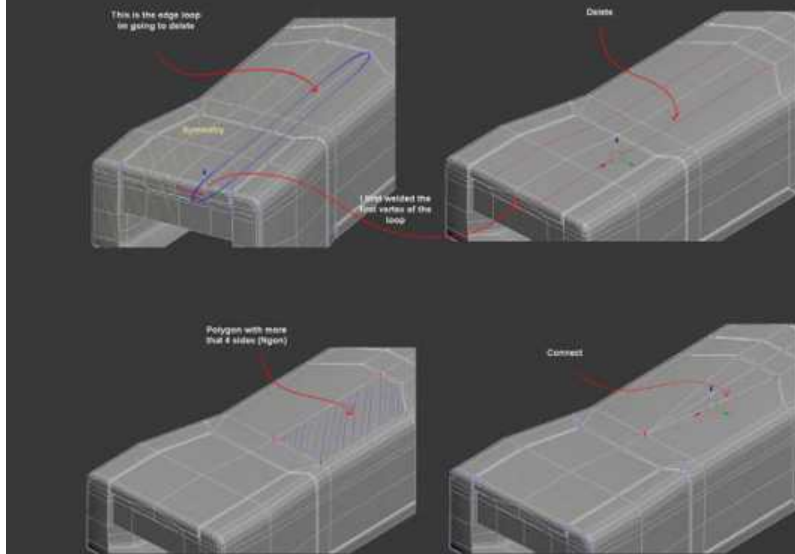
So, how to make these chamfers? Simple, just select the complete loop of edges (around panels or any piece you want to make them) and apply a small Chamfer. You may need to also check for extra vertices to collapse and delete (06b, 06c, 06d). ▶

- Delete polygons that are not visible because they are hidden by other objects



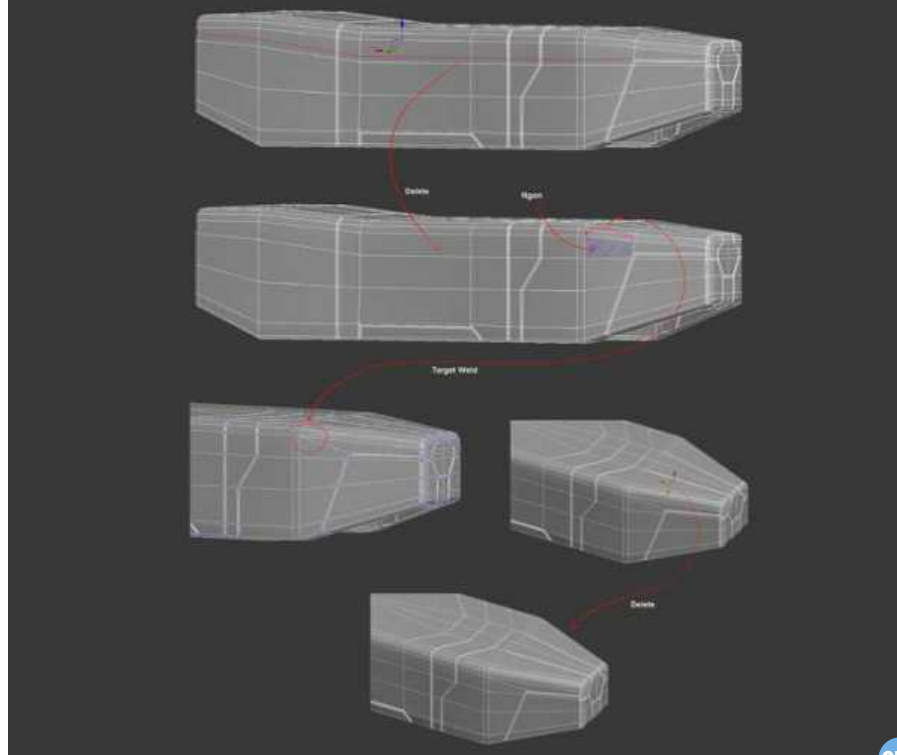
07a

- Collapse the first vertex of an edge loop and then delete that edge loop. Kill any resulting n-gons



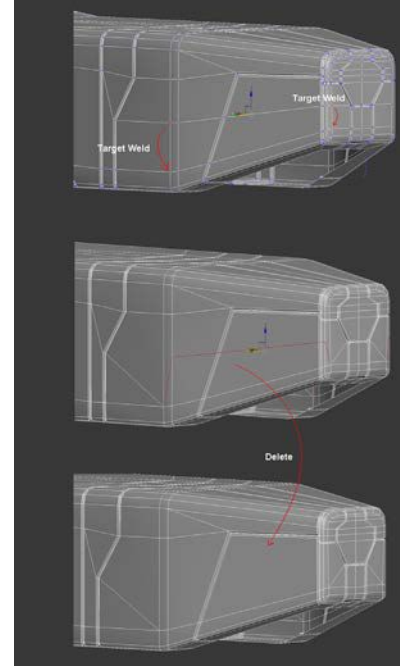
07b

- Delete an unused edge loop and kill any resulting n-gon by welding or connecting vertices



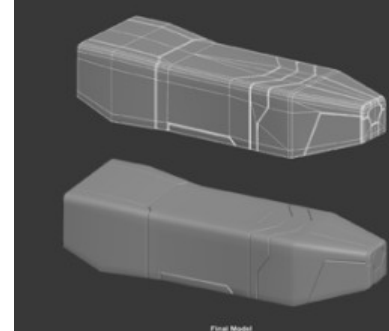
07c

- Collapse the first and last vertices of an edge loop and then delete that edge loop



07d

- Final model, detailed and optimized



07e

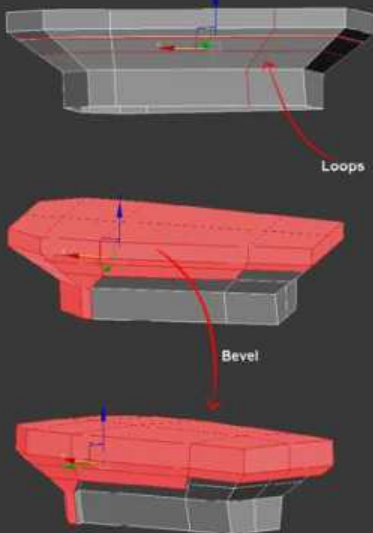
07 Optimization pass: Now that the model and the detail pass are completely done, it's time to optimize it by deleting and collapsing all the unused edges and vertices. I always start the optimization by selecting all the polygons that are hidden behind other objects and deleting them. In **07a** you can see that all the polygons at the bottom are covered by another object and are not visible, so I delete them.

After that I continue deleting extra edges. I select an unused loop of edges, collapse the first vertex

of the loop and then delete it. Keep in mind that when you delete a loop, you will usually end up with some n-gons left over (polygons with more than four sides), so be ready to look for them and add an extra edge to kill them as I show in **07b**, **07c** and **07d**. So far, this object is complete, detailed and optimized.

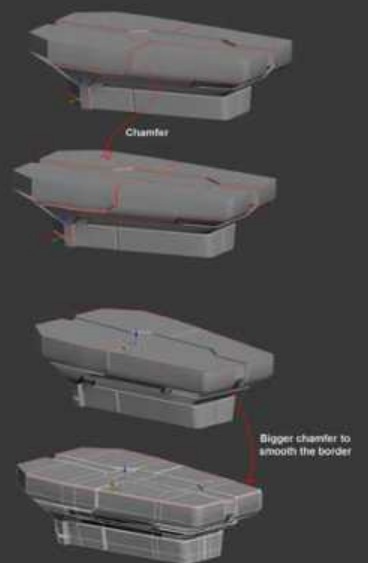
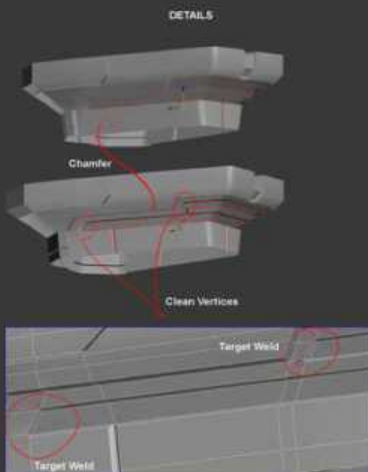
08 Making the main cabin: I use the same process I just showed you to make all the objects of the ship. For the cabin, I start by adding a bevel to the roof and back area, then

- Make some loops and select the respective polygons to make a bevel for the roof



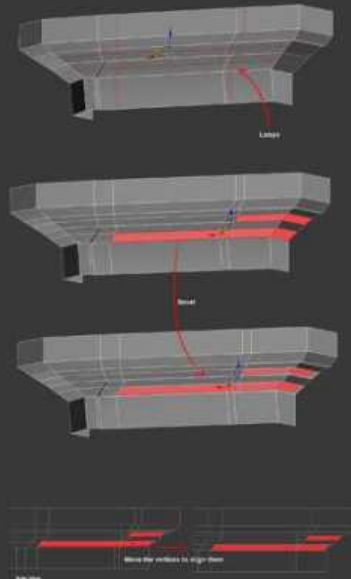
08a

- Select all the sharp edges and apply a chamfer. Remember to clean unnecessary vertices



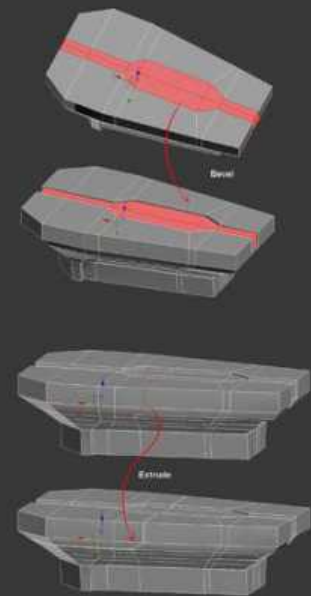
08d

- Make some loops and select the respective polygons to make the window. Remember to align the new vertices



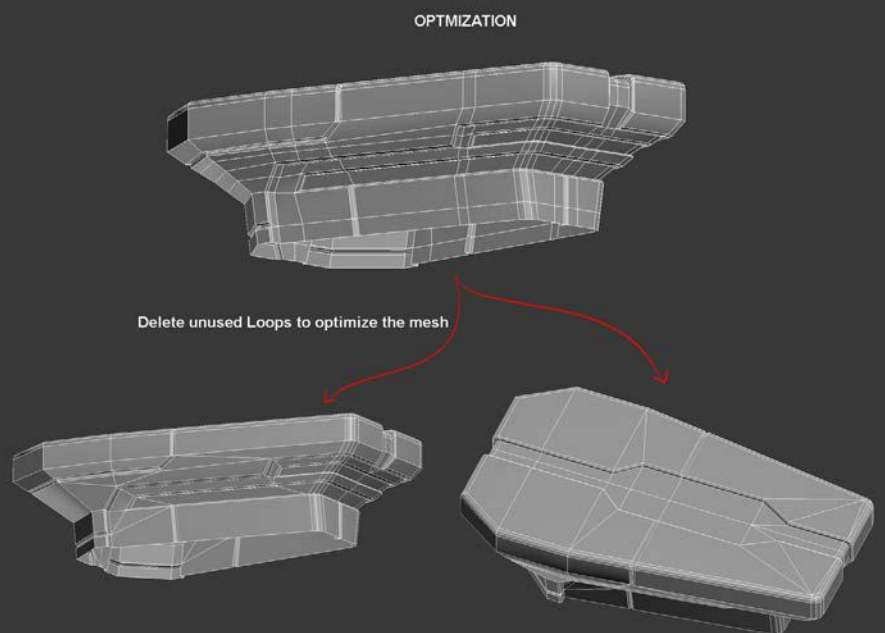
08b

- Make more bevels and cut-lines to add more interest to the piece



08c

- To optimize the mesh, delete unused edge loops and weld vertices to kill n-gons

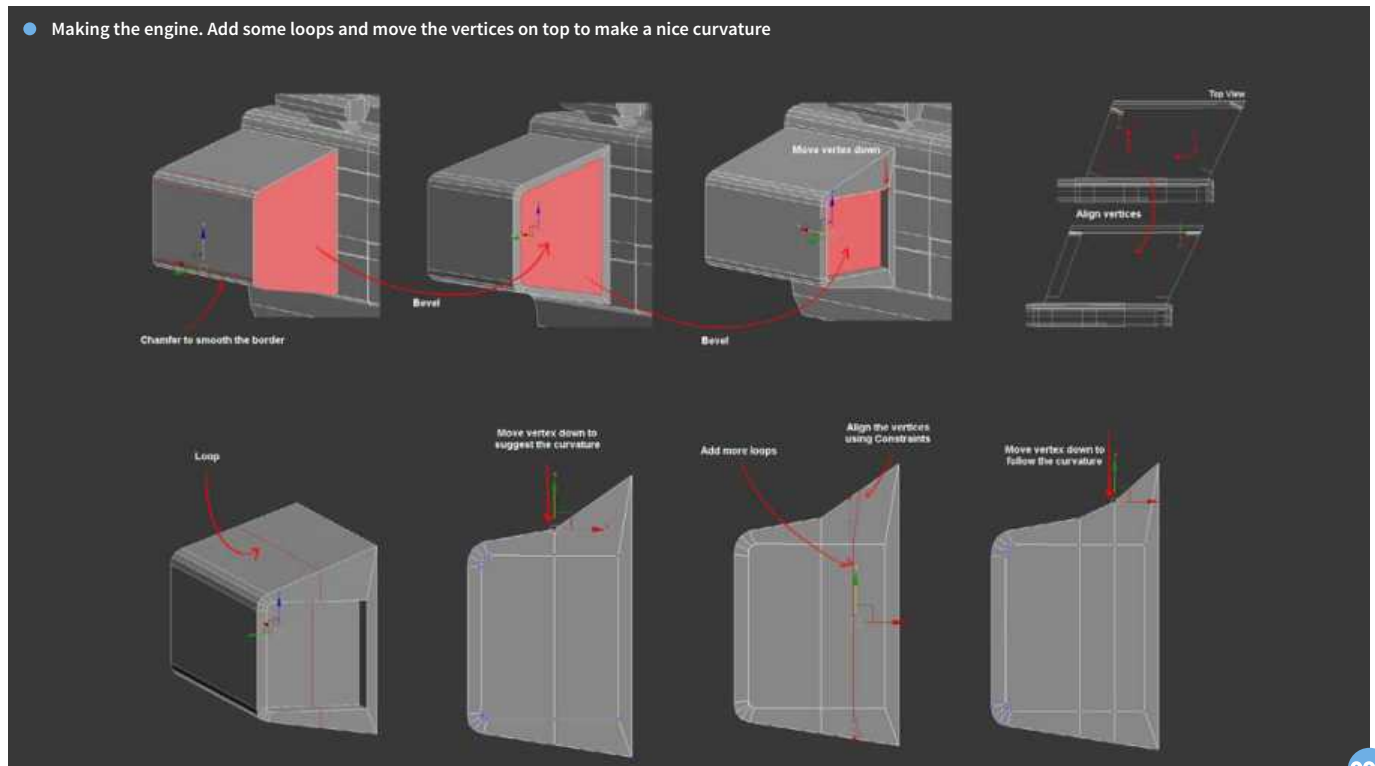


08e

make necessary edge loops (remember to use Constraints if you need them). Then instead of selecting the edges and making an extrude, I select the respective polygons and make a bevel outwards (08a). After that, I add more loops for the windows, then select the polygons and make a bevel inwards. Something to keep in mind when using bevels is to make sure that all the new

vertices are all aligned correctly (08b). To add more details and interest to the object, I make some cut-lines and panels around (08c). Finally, I make the detail pass and the optimization pass as described before. Don't forget to look for extra vertices to delete and collapse every time you make an edge chamfer or extrusion, as in 08d and 08e. ▶

- Making the engine. Add some loops and move the vertices on top to make a nice curvature



09a

09 Making the engines: I start the engines at this point, by making a big bevel for the grilles and a big chamfer to smooth the borders, make sure that all the vertices are well aligned when making bevels.

I also add some vertical loops here, and move the vertices on top to create a nice-looking curvature similar to the concept (09a). To make the grille, I detach the inside polygons from the bevel and delete all of the edges that I don't need. I add five edges, then select the six resulting polygons and apply bevels.

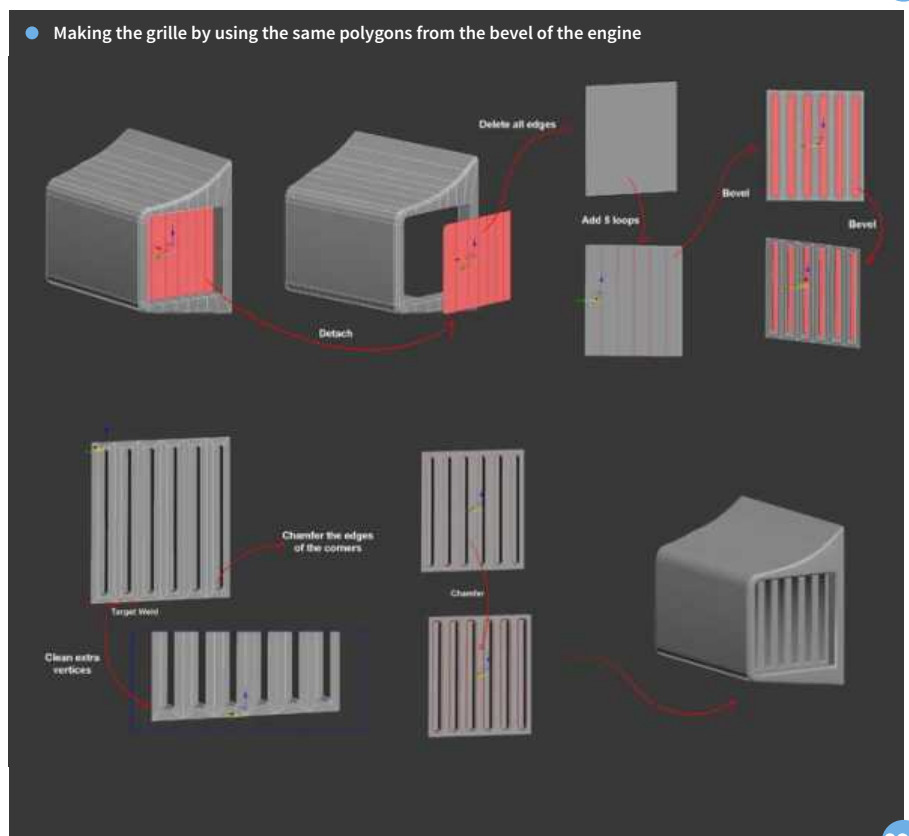
Once I have the six holes, I select the four corner edges and make a chamfer to suggest a more curved ending. And yes, it's time again to clean some extra vertices! I make the final chamfers to the borders of the grille and it's done (09b).

10 Making the bottom X-shaped vents: On the long bottom object of the ship I make four big inward bevels to add some vents. I take the polygon of the bevel and copy it to make the vents.

I create three edges and add a chamfer to them to create the separation between the vents. After that I make diagonal cuts on the big polygons to get the 'X' shape.

I select all the resulting triangles, make some bevels and delete the base polygons to get the holes (10a). Of course, I need to clean up some vertices in the process. For the detail pass, same

- Making the grille by using the same polygons from the bevel of the engine



09b

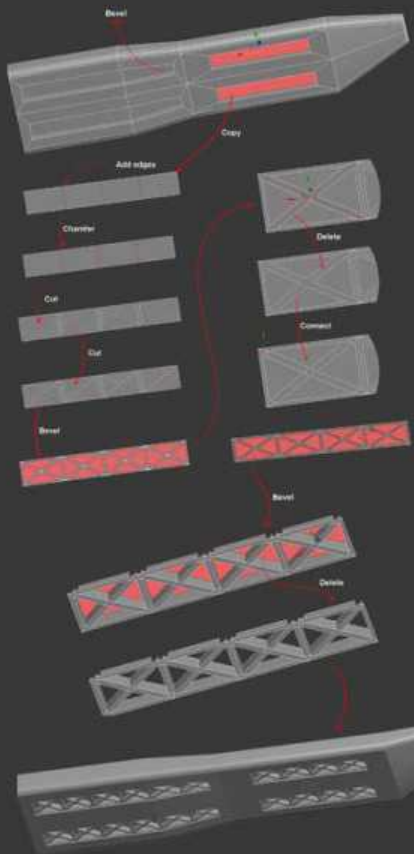
as usual, I select all the edges, apply a chamfer and then clean up (10b).

11 Making the back section of the ship: Following the same process, I make all the ship's components: making loops, bevels, extrusions, chamfers, and always remembering to clean the geometry by collapsing and deleting

extra vertices. Keep in mind to use the Constraints option when necessary. Make the optimization pass to keep the mesh optimal, as if for the final game engine.

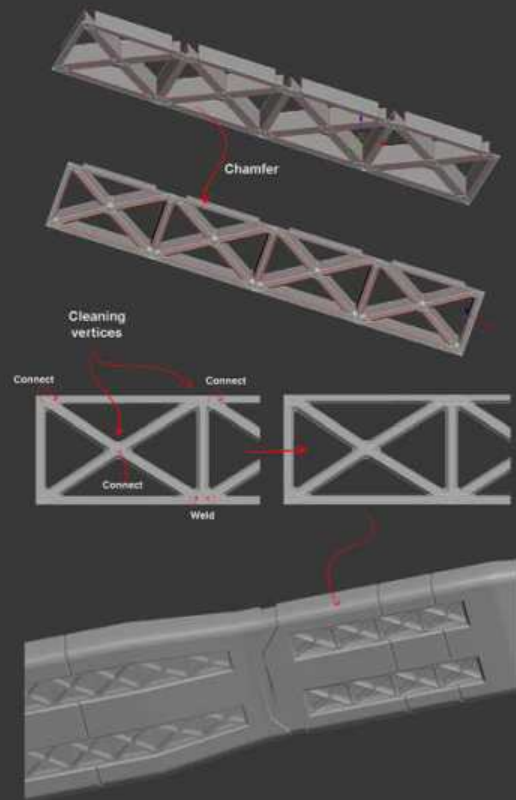
I show in 11a and 11b one final example of how I make the back section of the ship. Now you can go and give it a try with the rest of the objects. ►

- To make the X-shaped vents, make some cut and extrude the triangles



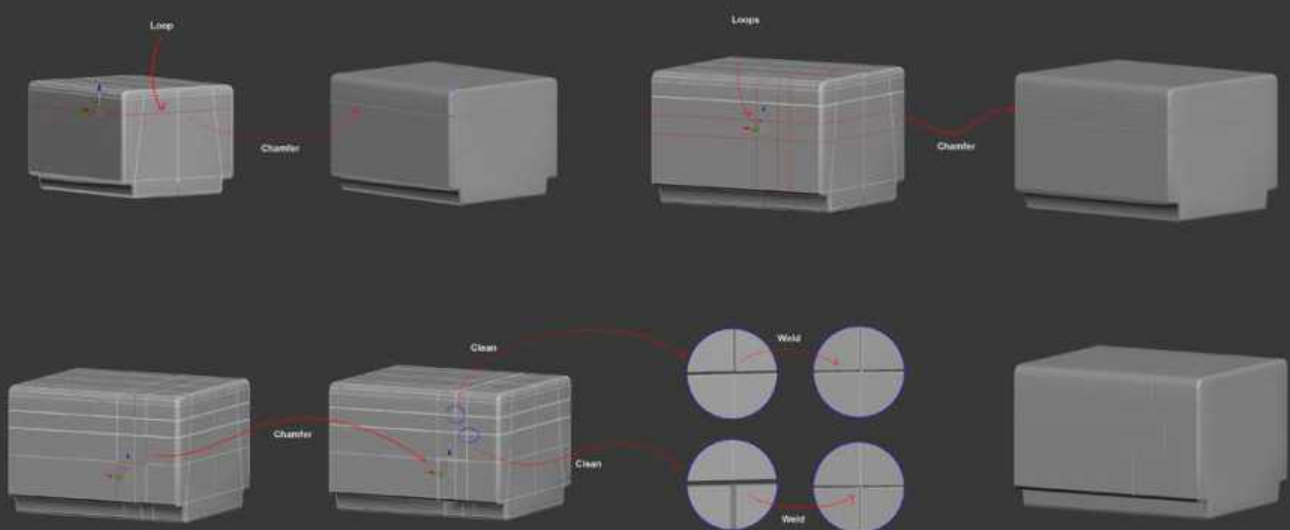
10a

- Detailing pass for the X-shaped vents



10b

- Modeling the back piece of the ship by adding loops and making extrusions



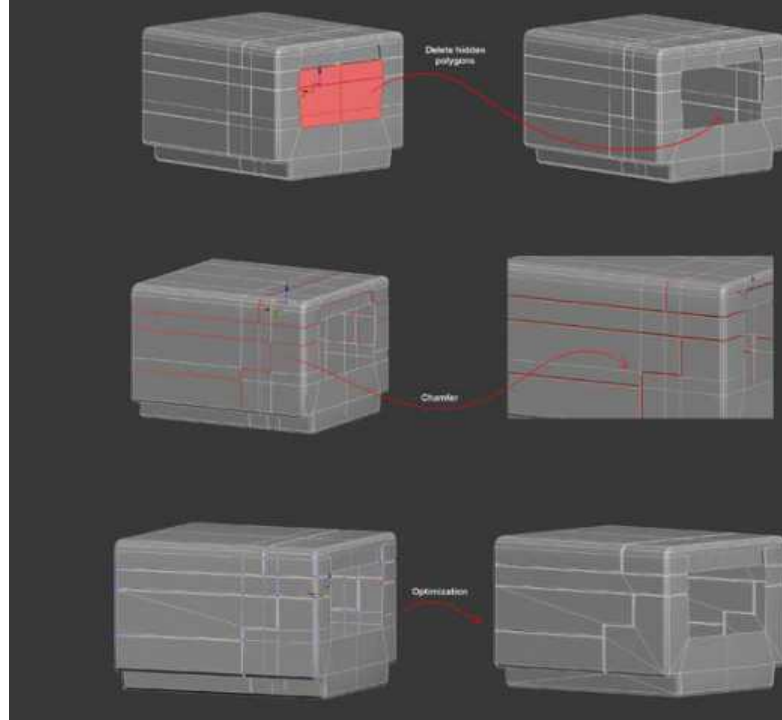
11a

12 N-gon checks and collapsing

Symmetry: Once I've finished all the pieces of the model, it's time to make sure I don't have any n-gons. A quick and easy way to do so is by going to the Graphite Modeling Tool found on the ribbon. You need to select the model and, while in the polygon sub-object, go to the Selection panel in the Graphite Modeling tool. At the very end you will find an option to select: Equal, Less than, or Greater than the specified number of sides. Specify the number of sides as '4', press the '>' symbol and click Select. Now 3ds Max should have selected all the polygons in your model with more than four sides, so go simply ahead and make the corresponding connections to kill all the n-gons in the model. Repeat this process until you don't have any n-gons when pressing 'Select'.

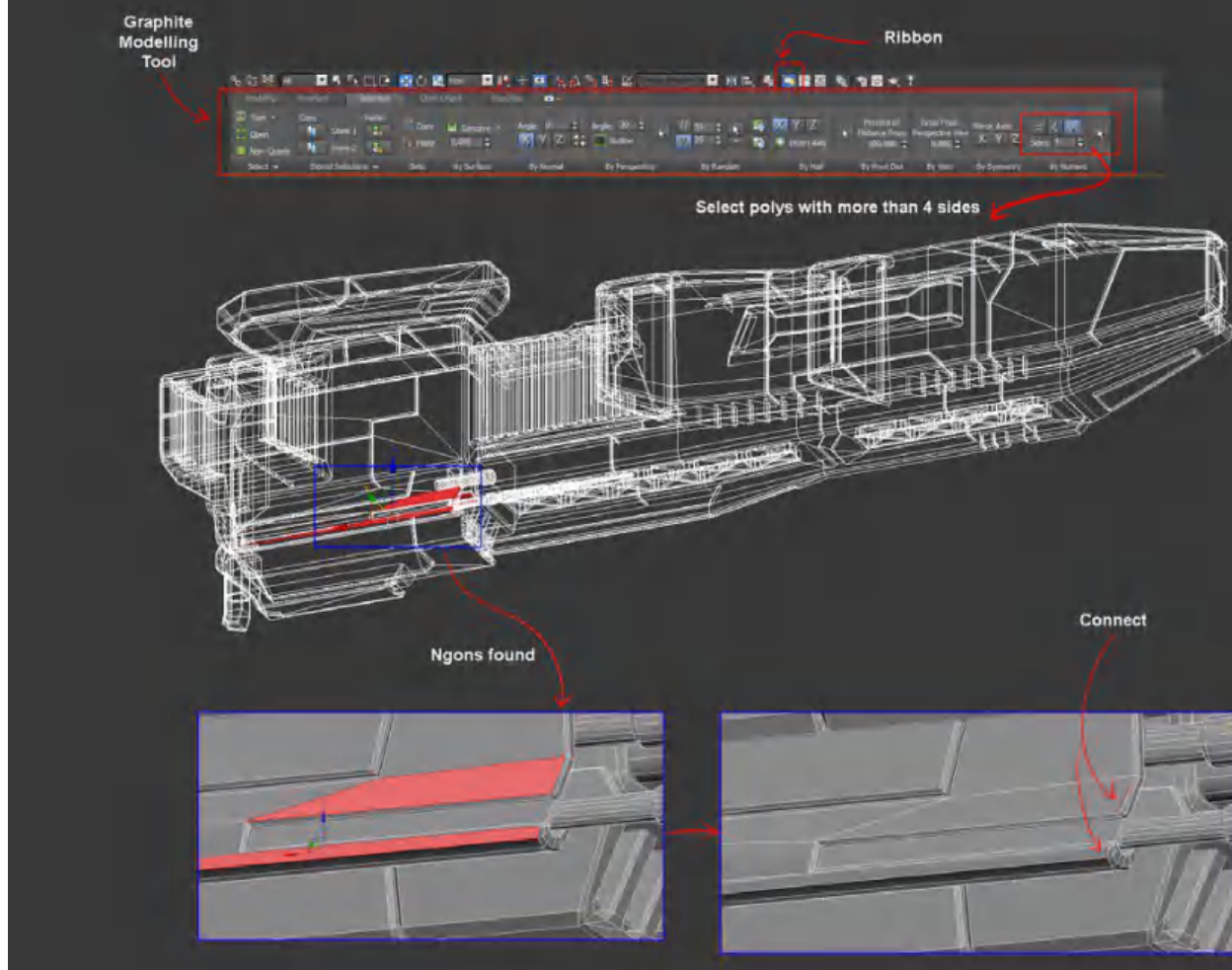
The final step is to collapse the symmetry. Make sure that all the center vertices are in '0' for the 'Y' axis (if you are using the model I've provided) and collapse the Symmetry modifier. Now, check for n-gons again, as sometimes collapsing symmetry may create new n-gons in the center of the model.

● Making the detail pass and optimization pass on the back piece of the ship



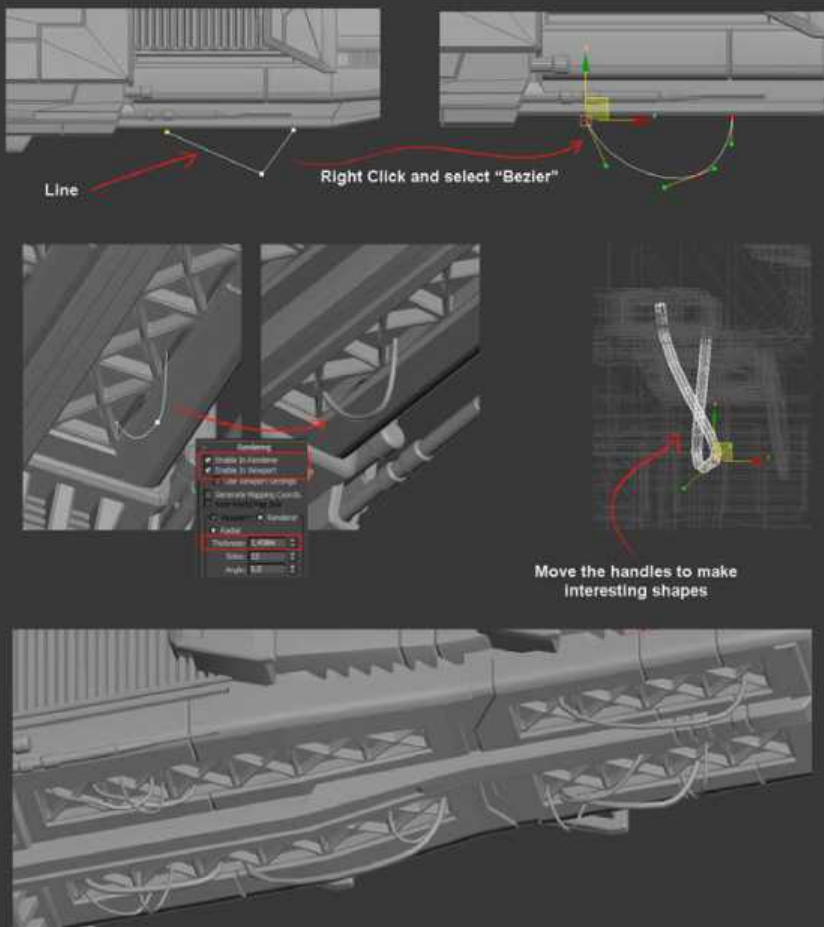
11b

● Checking for n-gons using the selection option from the Graphite Modeling Tool



12

- Use lines to make the cable and play around with the Bezier handles to make interesting shapes

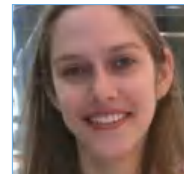


13 Making the cables: Cables are a final detail that I always like to include in all my models, as they give a nice look and visual interest to any piece. I make them with Lines. I start by making a line of three vertices (you don't need more for a simple cable), then selecting all three vertices. By right-clicking, I select the Bezier option so I can now use the Bezier handles of each vertex to have more control in making the shape I want for the cable.

I play a bit with the flow of the cable by moving the vertices and the Bezier handles, making twists to give more visual interest. Make sure you have activated the 'Enable in renderer' and 'Enable in viewport' options under the Rendering panel, and also feel free to use different Thickness values for the cables (13a).

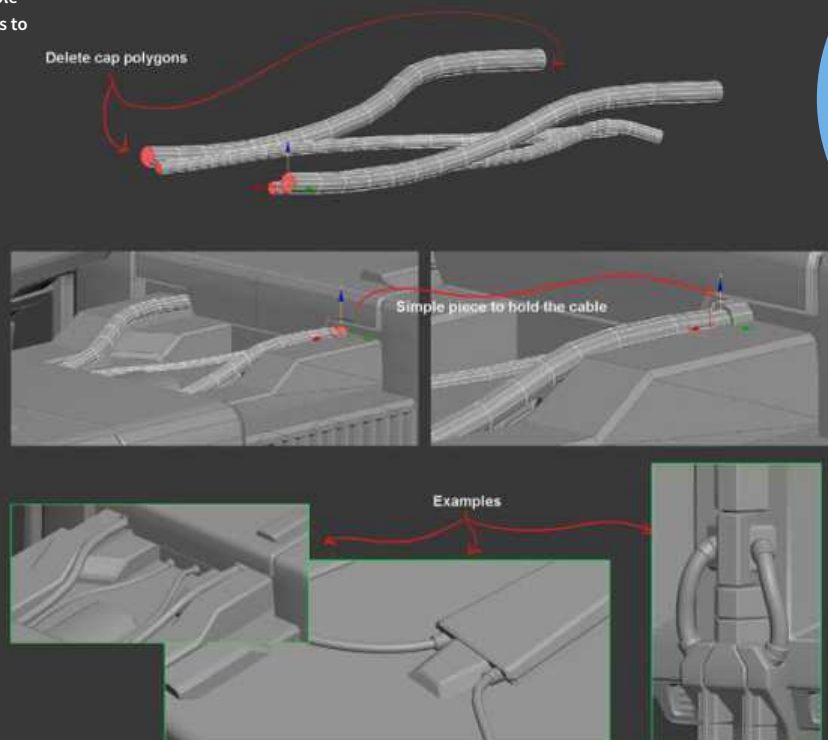
Once I've populated my model with cables, I convert them to Editable Polys and delete all the cap polygons at the end of each cable. I also make a little piece to hold the cables so they look more real (13b).

The Artist



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- Convert the lines to Editable Polys and add more details to the cables



NEXT ISSUE
Victoria textures the ship with Photoshop and Substance Designer

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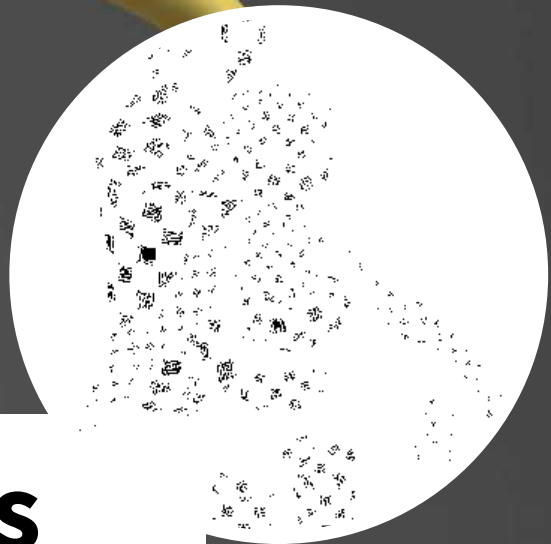
Roumen Filipov

roumenfilipov.com

Software Used:

3ds Max

Roumen Filipov is a 3D generalist born in Bulgaria, currently living in Brazil. His specialty is making 3D characters for film and the advertising agency.



UVing characters in 3ds Max

by Roumen Filipov

Join Roumen Filipov as he offers in-depth techniques for refining a character model and getting the most out of 3ds Max's UV mapping tools ▶

Improve your ZBrush workflow by following Roumen Filipov's tutorial advice...

This is the second of a series of four tutorials covering the production of a stylized 3D character of a steampunk pest exterminator girl using ZBrush and 3ds Max, from the initial blocking to the final render and post-production. In this second part, we will look at the modeling and retopology of the sculpted mesh done in the previous tutorial as well as UV mapping techniques, all inside 3ds Max.

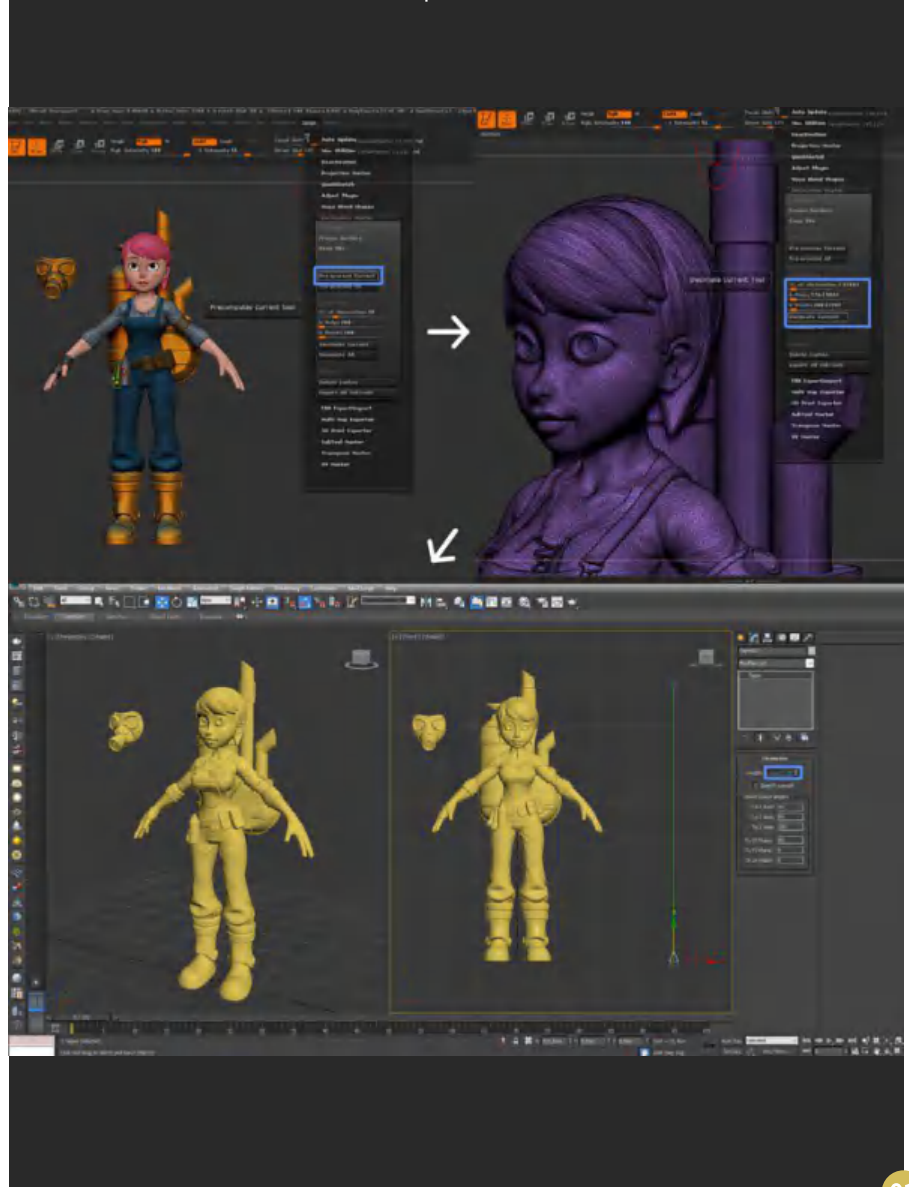
During the process, I'll be showing how to mix 3D sculpting with the awesome polygon modeling tools present in 3ds Max in order to achieve every aspect of the final topology, without losing silhouette and shape of the character. This tutorial will also show some workflows using modifiers to improve our modeling speed, the benefits of instancing geometry, and finally some tricks using the native UV mapping tools in 3ds Max in order to prepare the mesh for displacement sculpting and texturing.

Now let's have some fun!

01 Preparing the sculpted mesh: Before starting to work in 3ds Max, the sculpted mesh needs to be prepared to be exported from ZBrush. The problem between the two softwares is that 3ds Max can't handle the amount of polygons displayed in ZBrush, so the first step is to use the Decimation Master plugin to reduce the polygon count without losing details. This depends on your video card, so testing is necessary, but in my case a little less than 600k is okay for smooth performance. After importing the mesh into 3ds Max, I usually scale the mesh to something around 1.80 meters tall for lighting and shading precision in later steps.

02 Using the PolyDraw Tool: The easiest and most secure way of starting to draw the new topology over the mesh is to create any primitive in the scene and add an Edit Poly modifier to unlock the PolyDraw tool. It's a very efficient tool but a little confusing in the beginning. You need to select a mesh to draw over by clicking the Pick button, then select Step Build to start creating vertices. Connect the vertices by holding Shift and dragging over them with the left mouse button. To begin with, I always draw the basic circular loops around the openings of the face, like the mouth and eyes, as they are the most important loops for deformation. ►

● Decimation Master workflow and 3ds Max setup

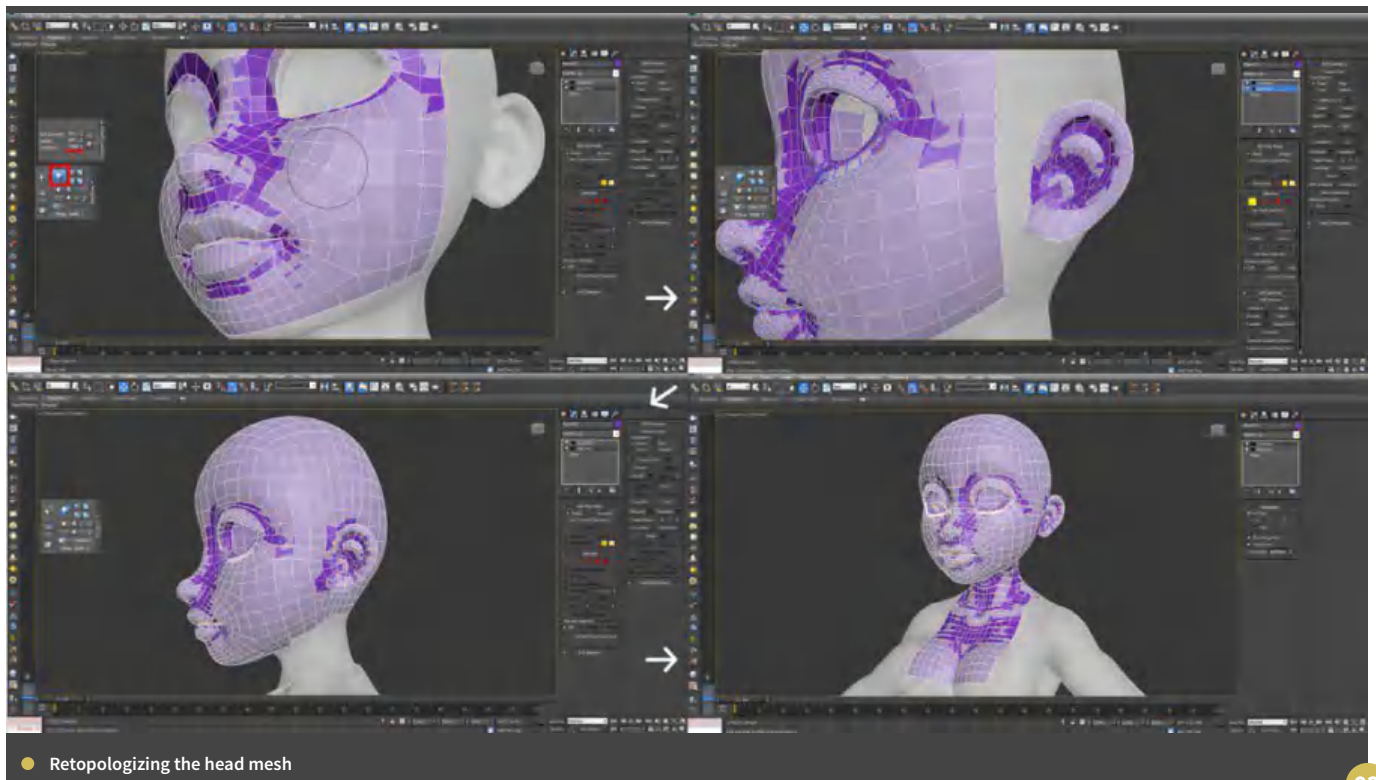


01

● Process of retopology using the PolyDraw tool



02



03



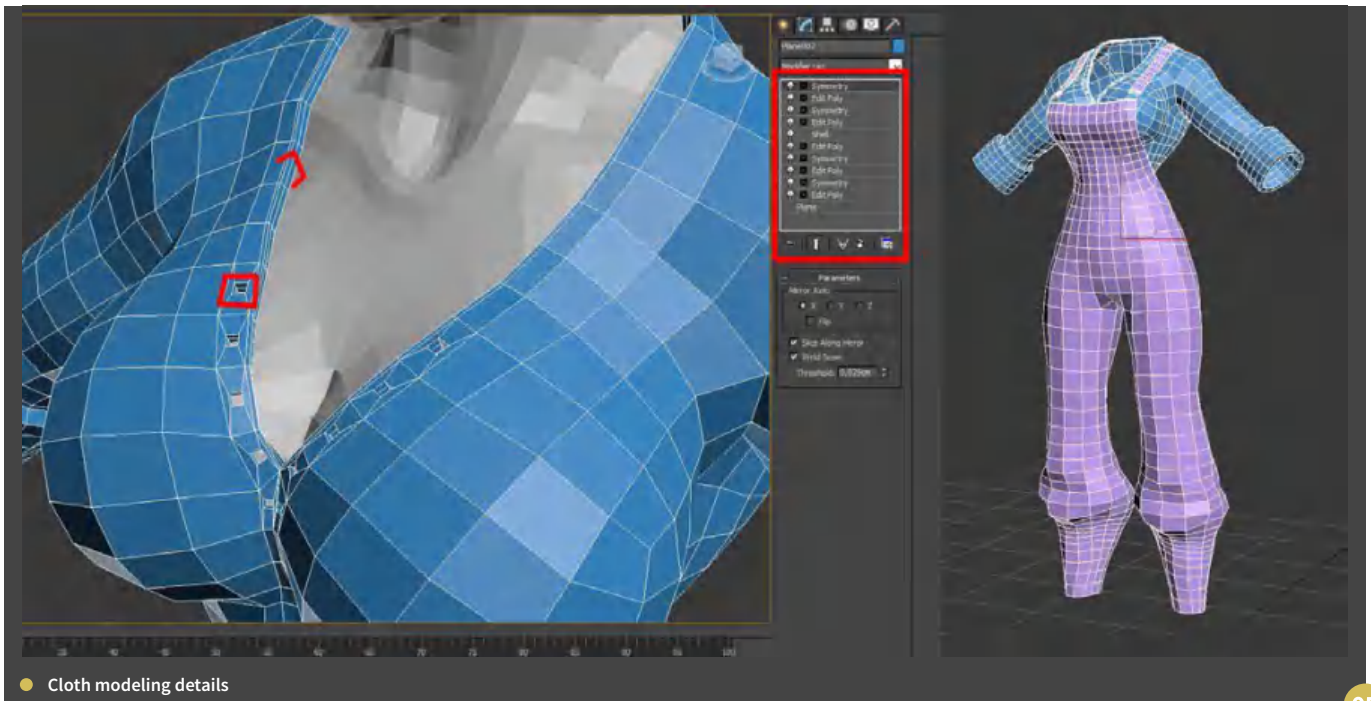
04

03 Retopology of the head: After making the circular loops in the face, I start connecting them using the Extend option in PolyDraw. To increase mesh density and relax it locally over the mesh, I manually connect the edge loops using the Edit Poly modifier and then use the Conform brushes to stick the new mesh over the sculpted character, so it follows the surface along with the drawn polygons. To finish

the head, I connect them in the back and start dragging edges downwards until reaching the neck and bust.

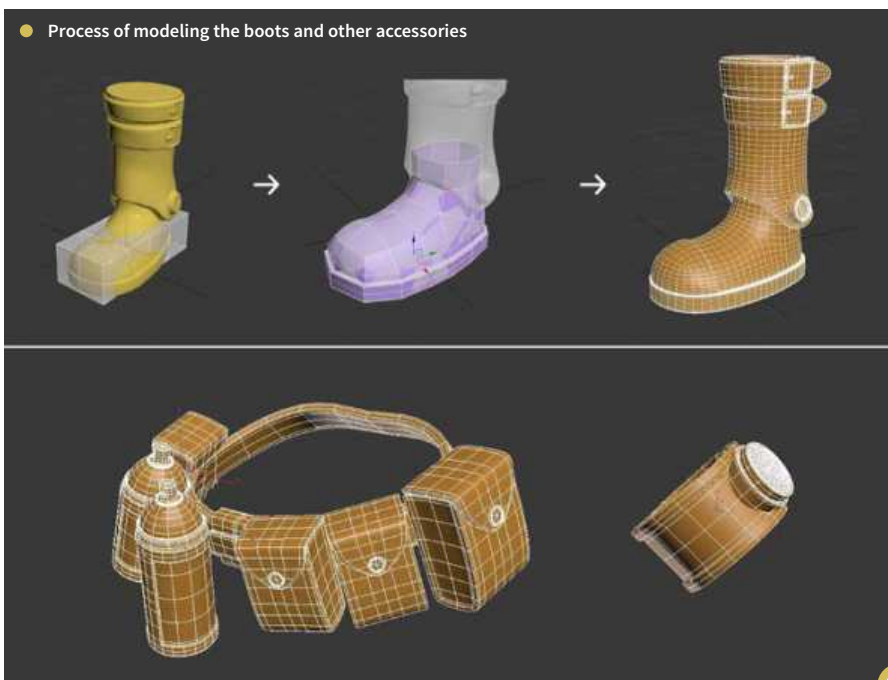
04 Building the arms: There are some very quick ways to build efficient topology without drawing poly by poly over the sculpted mesh. One of the best for me is to pose basic cylinders over the arms and legs, subdivide them

properly and use the Conform brush to make them follow the surface. After that, I attach the conformed cylinders to the main topology and connect them properly. This same process is used for the hands and fingers, with some adjustments in PolyDraw afterwards. Any other details like the insides of the mouth and eye cavities are modeled using the Edit Poly tools, since they are not sculpted in the original mesh.



- Cloth modeling details

05



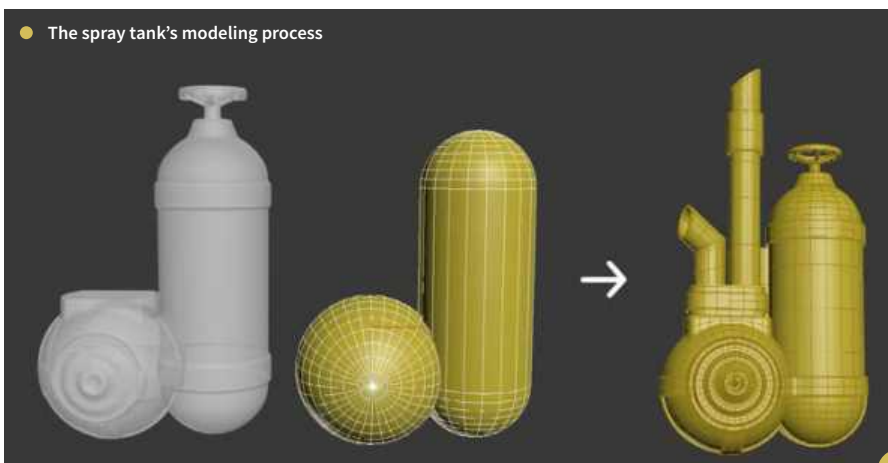
- **Process of modeling the boots and other accessories**

05 Modeling the clothes:

Now that the required portion of the body has proper topology, I start creating the clothes using similar techniques. The difference now is that the cloth needs to be thick and more precise than the sculpted version, and this can easily be achieved using a lot of stacked modifiers adding local and general modifications to the mesh. Having three or four Edit Poly modifiers is very useful to go up and down in the hierarchy, always having in mind that lower modifiers affect the behavior of all those above.

06 Modeling the hard-surface accessories:

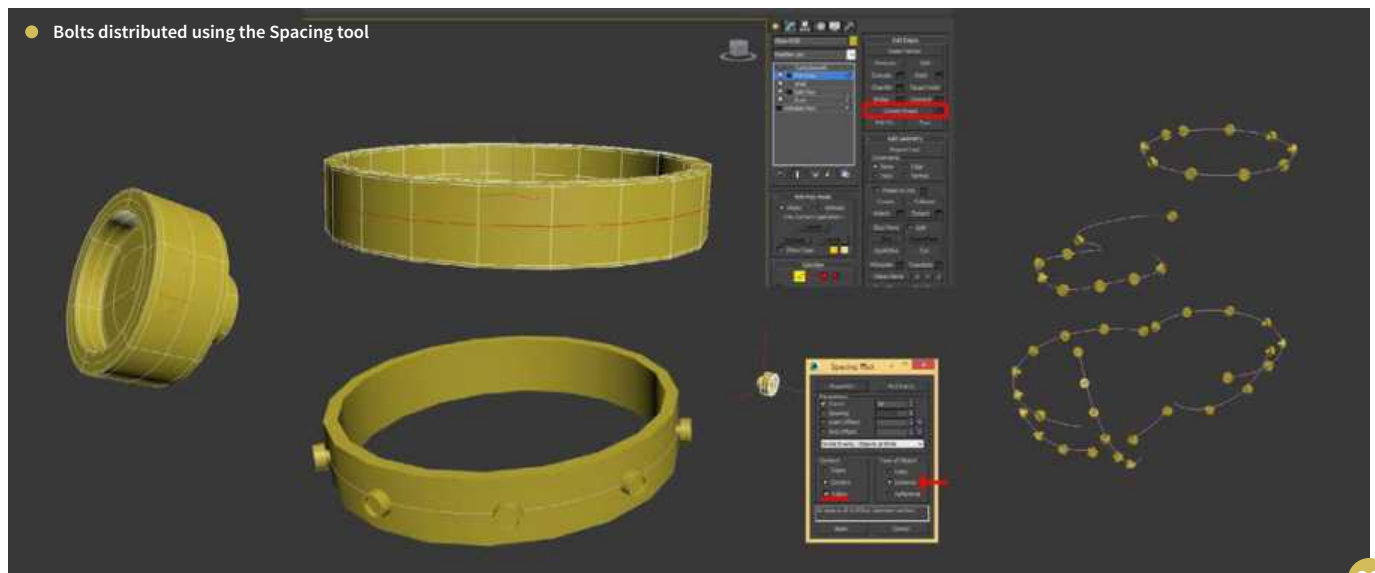
Some parts of the character are easier to model from scratch in 3ds Max in order to achieve hard-surface precision. For the boots, I model everything from a box primitive, using the Conform brush for the upper part. After the basic shape is done, I model the belts and buckles separately. The rest of the props and accessories are made using similar techniques, always leaving identical meshes like the pockets on the belt as instances; this will make future changes faster to make on all the models simultaneously.



- The spray tank's modeling process

07 Modeling the tank:

There's no point in doing retopology of an object based on primitive shapes. To model the spray tank I start by blocking a sphere and a capsule primitive over the sculpted mesh, then start subdividing the meshes and extracting other parts from the same. I make the pipes using primitive cylinders, adding thickness at the end using a Shell modifier. Everything is attached at the end in order to unwrap the mesh later. ►



08

08 Distributing the bolts: Some repeated details, such as bolts and clips, are always easier to model once and duplicate using instanced geometry. There are some ways to easily position repeated models along surfaces; in the case of the bolts, I extract some Splines from the tank mesh then use them as target shapes in 3ds Max's Spacing Tool to make the instances follow. In other cases, when the number of meshes is bigger and more random, it's better to use tools like the Object Paint, Array, Particle Flow or even instanced geometry in the Hair And Fur modifier.

09 Finishing the spray tank models: As described in the first tutorial, the spray tank had no need to be blocked in ZBrush since it's a separate part and does not influence the overall shape and silhouette of the character. It's always good to remember that the whole process is not necessarily linear, and if the artist feels the need to go back and redo some stuff, they can definitely do it with no fear. I create the spray tank model using a line shape with thickness, then converting it to an Editable Poly and extracting the other meshes from it.

10 Modeling the eye: The last model that deserves special attention in the character is also one of the most important of all: the eyes. A character can look either dead or alive through the eyes' appearance, so precision is important here. I always model the eye with a large pupil so it can easily be dilated later without losing iris details. To behave realistically, I model an external sphere to add refraction and distort the sclera.

11 Unwrapping the body: Now that we have a proper topology for deformation and rendering, it's time to prepare

● Final models of the spray tank



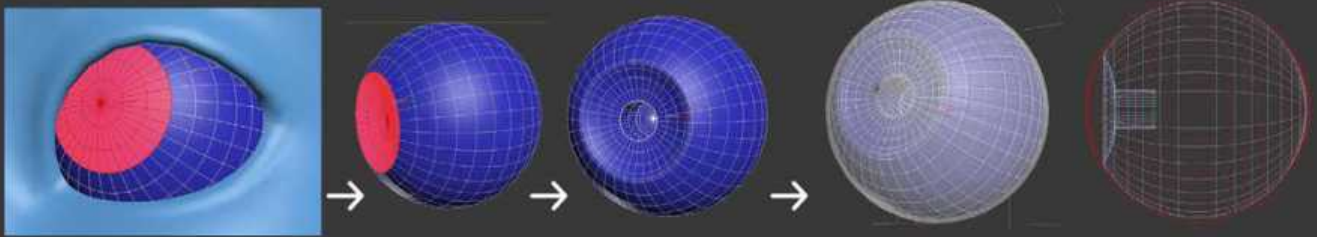
09

for displacement sculpting and texturing by unwrapping all of the relevant parts in 3ds Max. I usually begin with the most organic and complicated parts like the body. I use a workflow based on making the mesh planar, cutting where I want it to be opened and then unfolding it using

the Quick Peel button combined with Relax in the Tools tab.

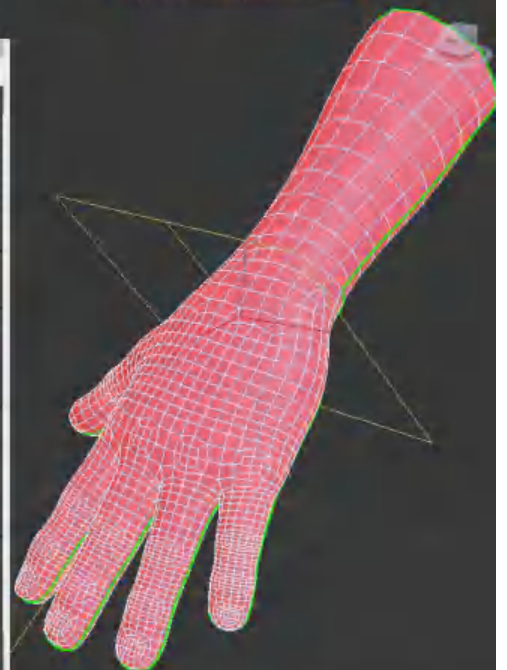
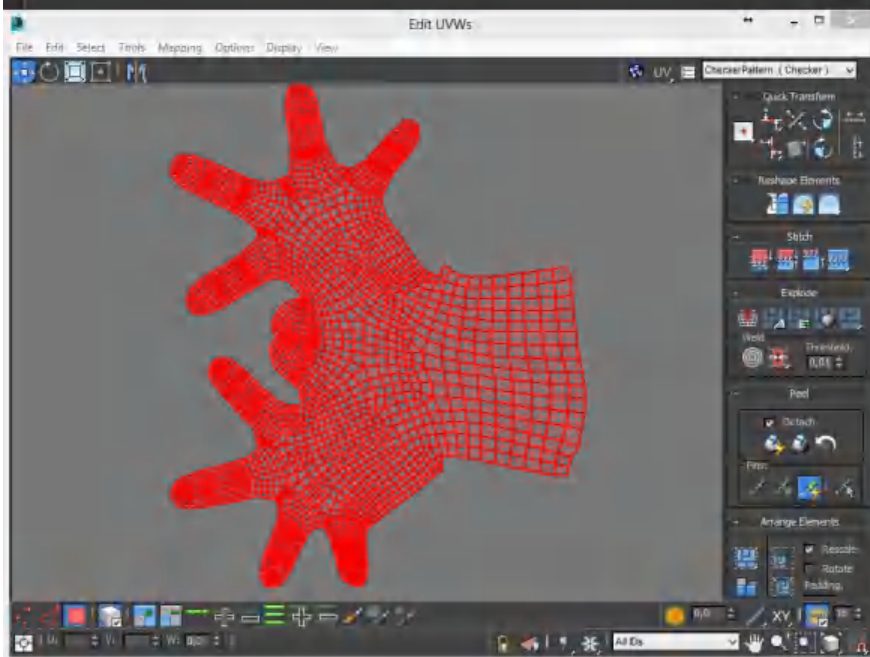
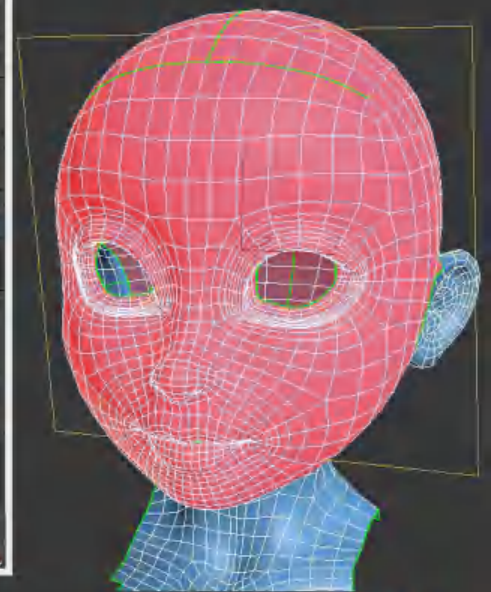
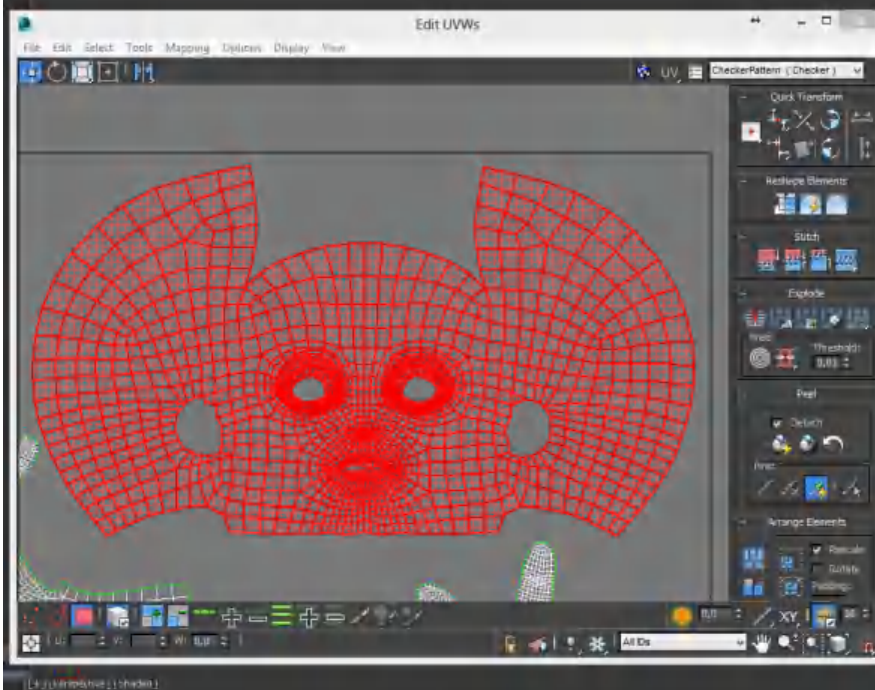
It's always good to cut the mesh in areas less visible or with strategic texture transitions, like the sides of the fingers and the back of the head. ►

● Eye modeling process



10

● UV layouts of the head and hands



11

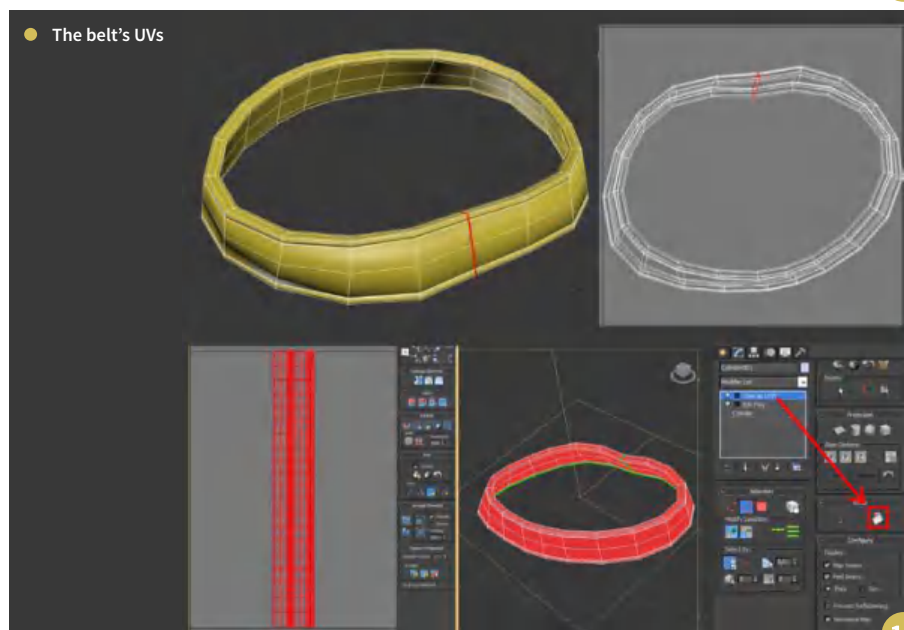
12 Unwrapping the clothes: It's important to know what kind of object you are unwrapping and how the shader will behave to speed up further steps and avoid headaches like correcting seams and distortions on the texture. Clothes are the most common case of objects with bad shading due to chaotic UVs, thus I always cut the mesh and arrange the UV islands so that the fabric texture follows the cloth panels like it would be before being stitched.

13 Unwrapping the belt: Some stuff like belts and cloth strips are always boring to unwrap, even in more advanced UV software, but 3ds Max have a very good specific tool just for this case. When it comes to long cloth pieces that need to have a straight fabric flow, all the edges must be aligned horizontally or vertically. You can automatically achieve this just by selecting a perpendicular loop to the direction you want to unwrap, and clicking the 'Unfold Strip from Loop' button in the Wrap tab from the Unwrap UVW modifier. It will make an instant straight UV island.

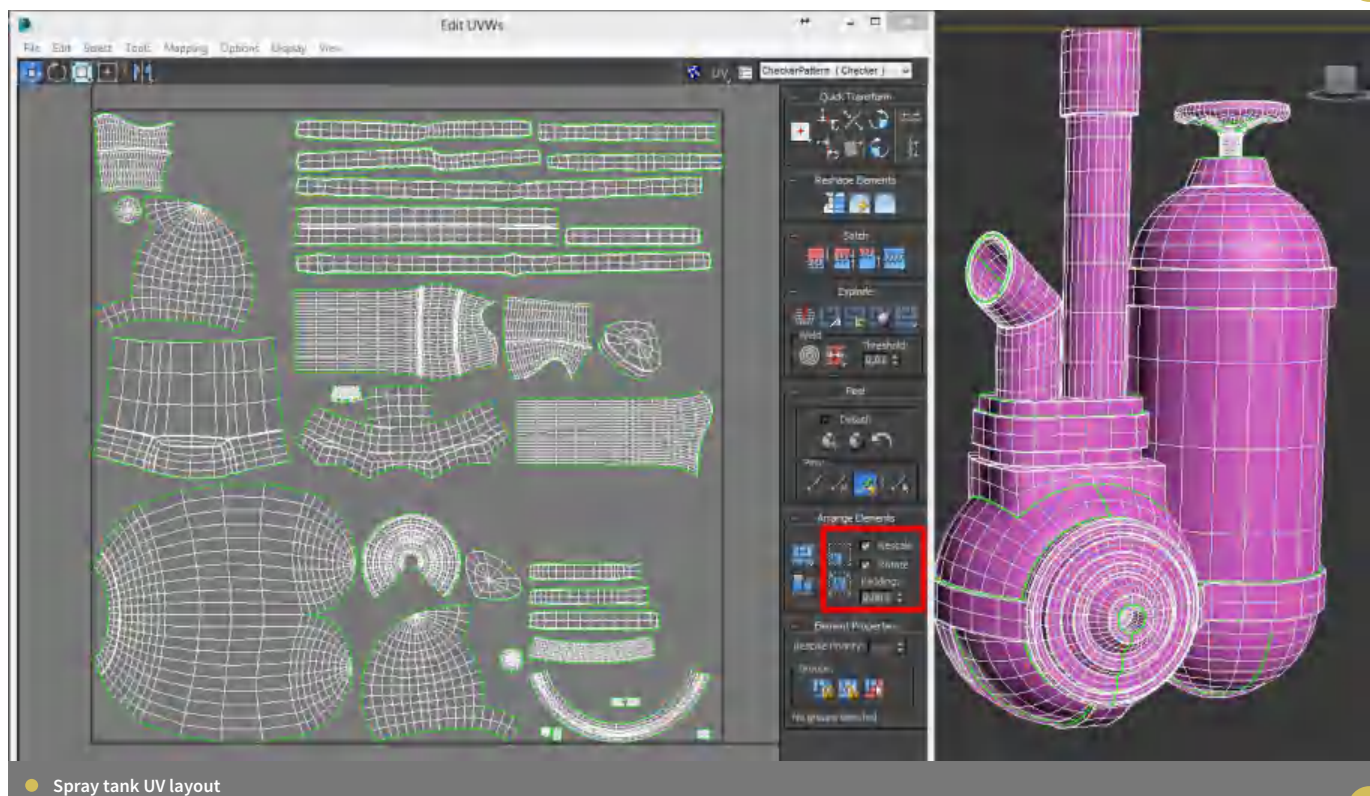
14 Unwrapping the spray tank: There are some more complex objects with too many elements to unfold one by one in a single mesh. A workaround I use for this is to break the model down into several similar meshes and unwrap them separately. After each mesh has its UVs completed, I attach them in one single model and then use the automatic pack options in the Arrange Elements tab located in the side bar of the UV Editor. I set the padding to a very low value



12

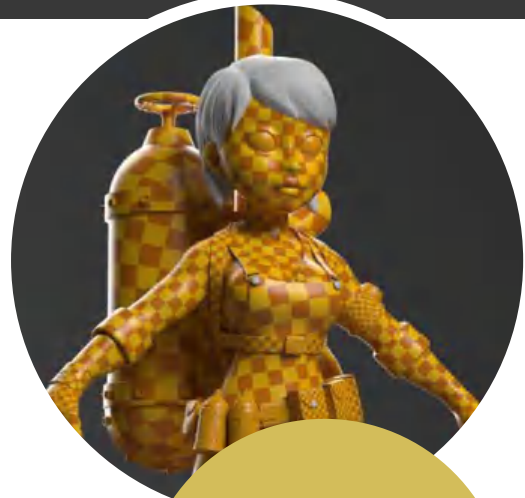


13



14

● Applying a checkered UV to the character



NEXT ISSUE
See how Roumen
Filipov creates
maps and textures



Roumen Filipov
roumenfilipov.com

and turn on Rotate, then finish by clicking the Pack Normalize button to rearrange the UVs into one tile.

15 **Finishing the UVs:** During and after each unwrapping, you must always keep

an eye open for any UV distortions in the more visible areas.

It's almost impossible to have a zero-percent distorted UV without breaking the mesh into dozens of islands, but you can try to hide the

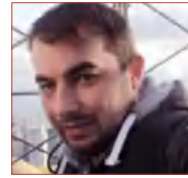
most critical ones. To visualize them, always have a good checker texture to hand to see if all the squares are well distributed. The standard black and white checker in 3ds Max is usually not very precise, so you can create your own with more information to visualize it better. ●



FREE RESOURCES

Model files
Alphas

The Artist



Andrew Finch

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Software Used:

3ds Max, ZBrush

Andrew Finch is a principle environment artist for Microsoft's Rare Studio. He has nine years' industry experience and is currently working on his eleventh title.

Modeling assets for real-time viewing

by Andrew Finch

Rare's Andrew Finch guides us through creating a Viking-inspired shield asset with 3ds Max and ZBrush, suitable for presentation with Marmoset Viewer 



Create a weathered Viking shield with Andrew Finch...

In this tutorial I will guide you through the process of creating a Viking shield inspired by the TV show *Vikings*. I will start off modeling a low-poly version of the shield in 3ds Max and import it into ZBrush for a high-poly sculpt. I will then use the high-poly mesh to bake down the normal maps for use on the lower-poly asset. I will briefly go through the modeling and sculpting stages as these processes are widely covered in other tutorials available on the internet.

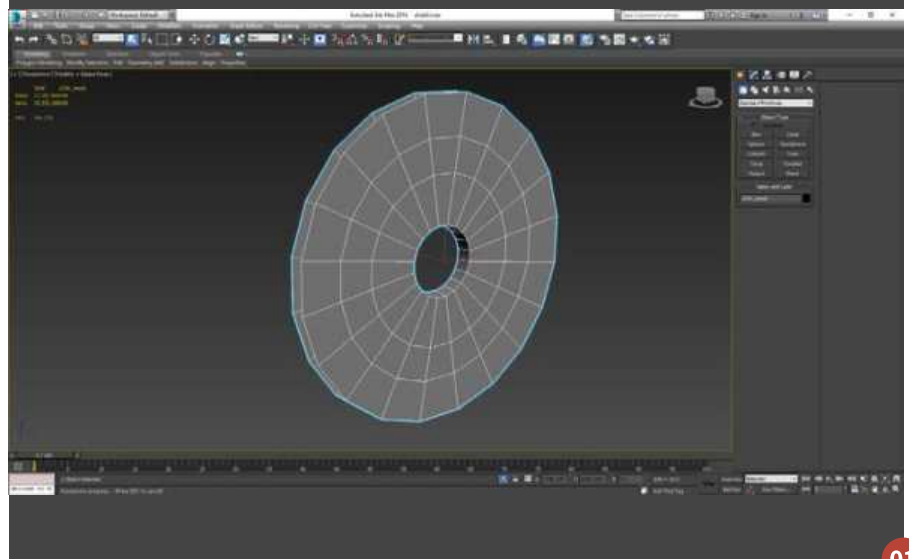
The main focuses of this series will be introducing Substance Painter into your workflow and, rather than rendering out still images, I will show you how to use the new Marmoset Viewer tool to create an interactive portfolio piece. This is a very impressive new way to display your artwork to potential employers, giving them the ability to examine your asset interactively.

01 The wooden base: The wooden base of the shield is made in 3ds Max from a basic cylinder primitive with extra divisions on the top and bottom of the cylinder. These extra cuts are to aid with the divisions later on when the asset is imported in ZBrush and heavily divided, ensuring the polygons are evenly distributed. I delete the central segment which will hold the metal hand guards and bridge the resulting gap. This is a very simple object but the detail is added in ZBrush during the high-poly sculpt.

02 The surrounding leather ring: To create the surrounding ring geometry, I extrude the outer edges of the wooden cylinder we created in the last step and detached the new polygons. With this new asset and the outer edges selected, bridge them to close the gap. As this is going to be made of leather, the edges would be quite soft and rounded, so I chamfer the outer edges to soften them. To solidify this mesh I add a shell modifier and extrude all the polygons inwards to give the leather some thickness.

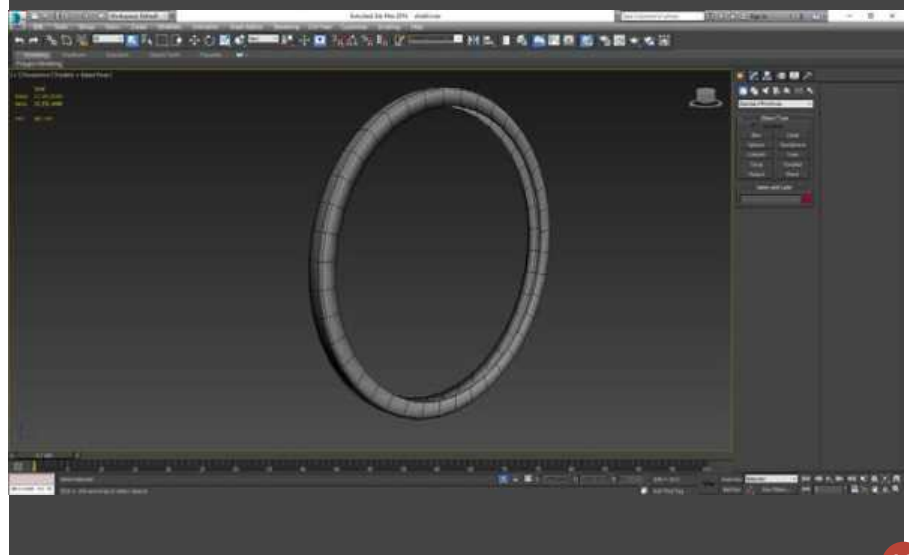
03 The metal hand guard: The metal hand guard is quite a spherical object, so I use snapping to create a sphere in the center of the shield and use the hemisphere options to cut the sphere in half so it sits flush with the wooden asset. Convert the sphere into an editable poly and delete the polygons facing the wood. Ring-select the outer edges and extrude them to create a lip that will have enough space for the nails that secure the hand guard to the wood. Also extrude the new lip's edges backwards to give the lip ▶

● Basic primitives are used to create most of this asset; here a cylinder makes up the wood of the shield



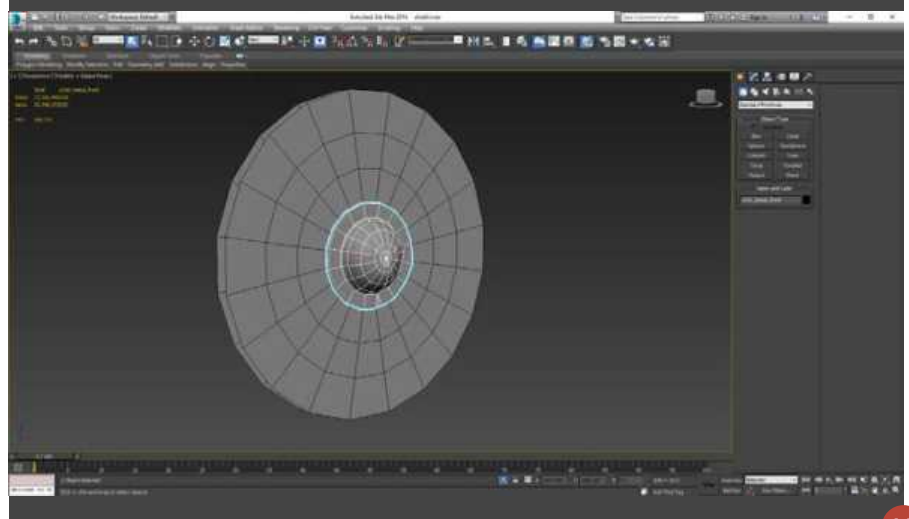
01

● The surrounding leather element is created from the previous cylinder asset to ensure a perfect fit



02

● The metal hand guard will break up the wooden surface and give nice metallic highlights in the finished model



03

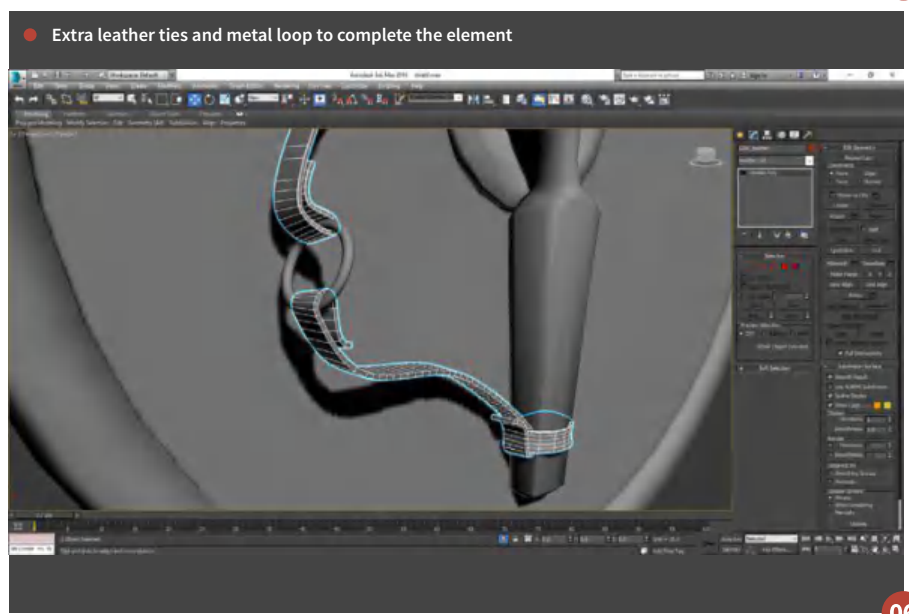
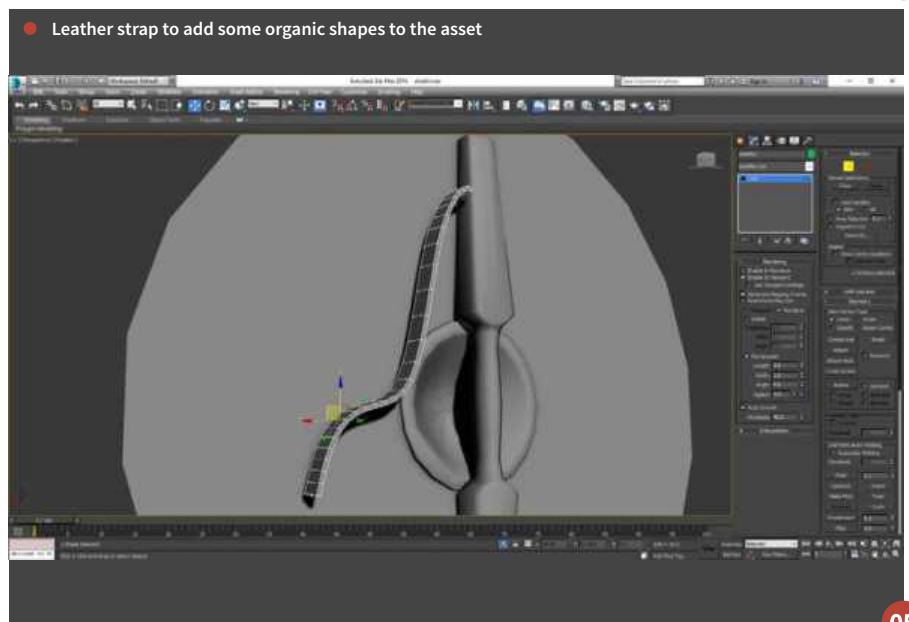
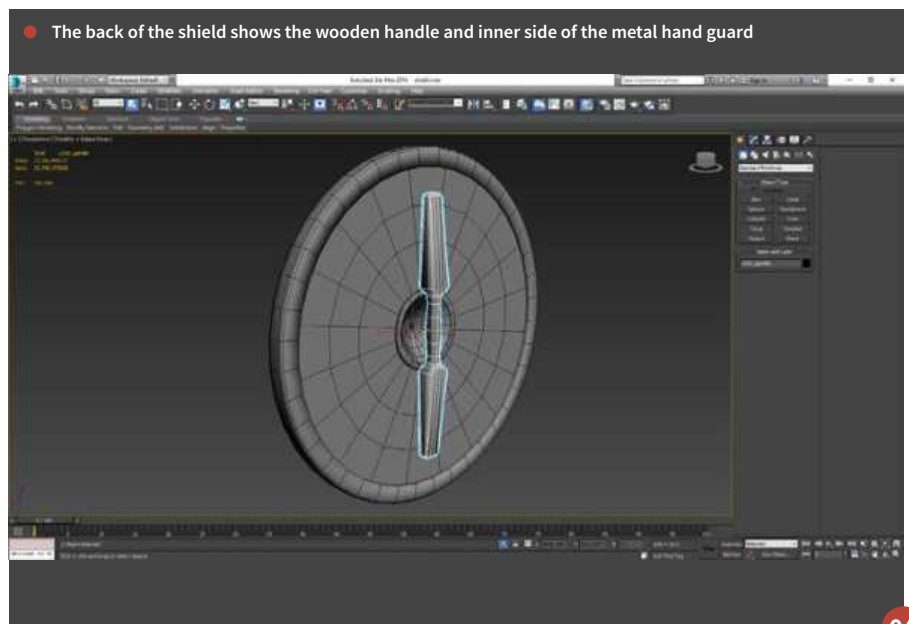
some depth. Chamfer not only the edge of the lip but also the intersection between the sphere.

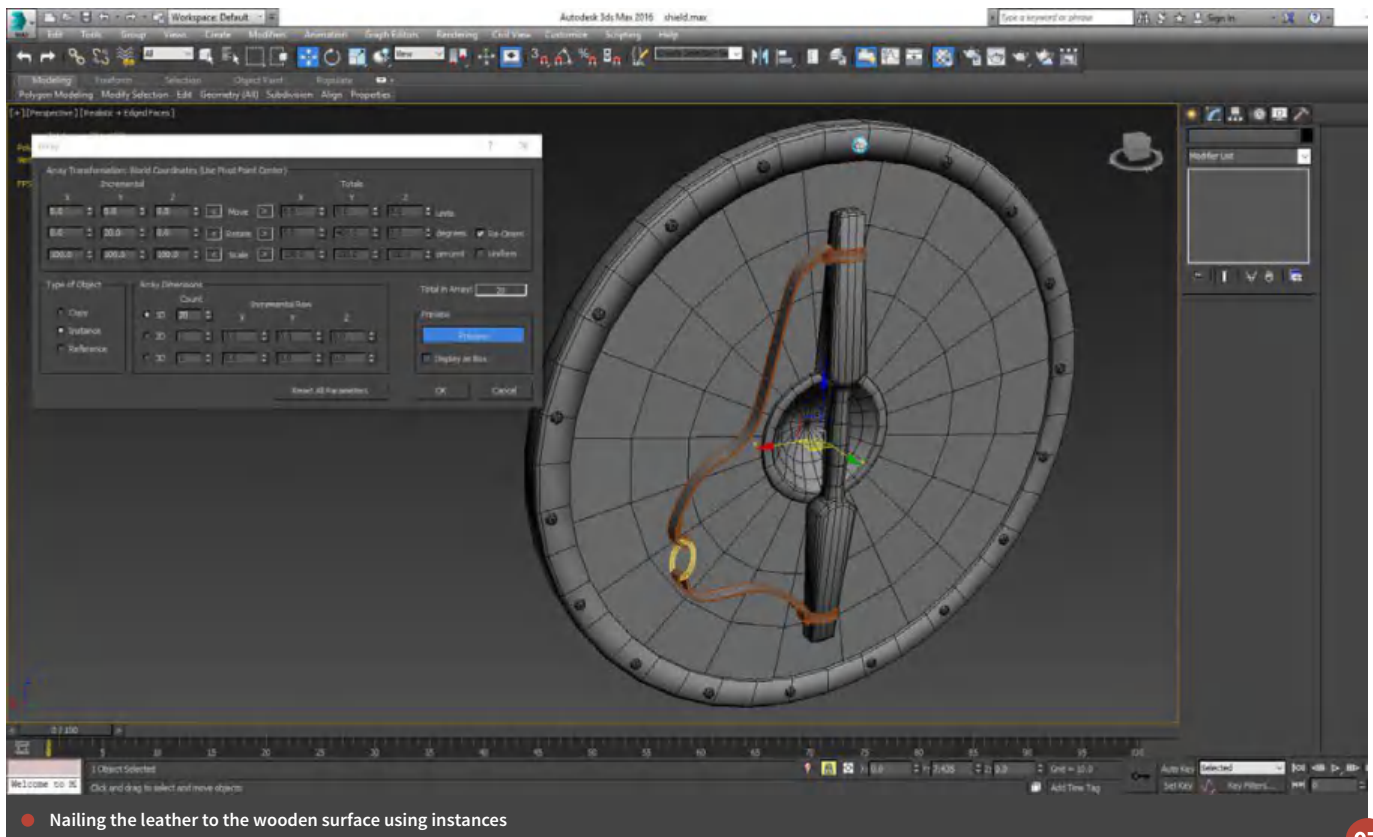
04 Modeling the wooden handle: The wooden handle consisted of two separate models that were welded together, I used a cylinder for the hand grip and a tapered box for the supports, the cylinder was tapered inwards at each end and slightly fattened in the middle to give it some form. I curved the top of the box so it blended smoothly into the cylinder. I also chamfered the edges as this would represent soft wood that has been battered and weathered from heavy use and the elements. I used the same technique for the inner hand guard as I did for the outer one, only it was an inward shape rather than outwards.

05 Leather strapping: The leather strap will add some more organic shapes to the asset and add some interesting highlights and shadows. It's created using simple splines with the 'Rendering > Enable in Viewport' option ticked. I use Smooth and Bezier Curves to form the shape. The leather uses the rectangular shape with a length of 5 and a width of 1. The leather will be a very interesting surface as it will have a lot of highlights and matte patches to vary the reflecting light. The stitching will also give a nice touch to the diffuse and normal map textures, all this helps convince the viewer that this is a real working asset.

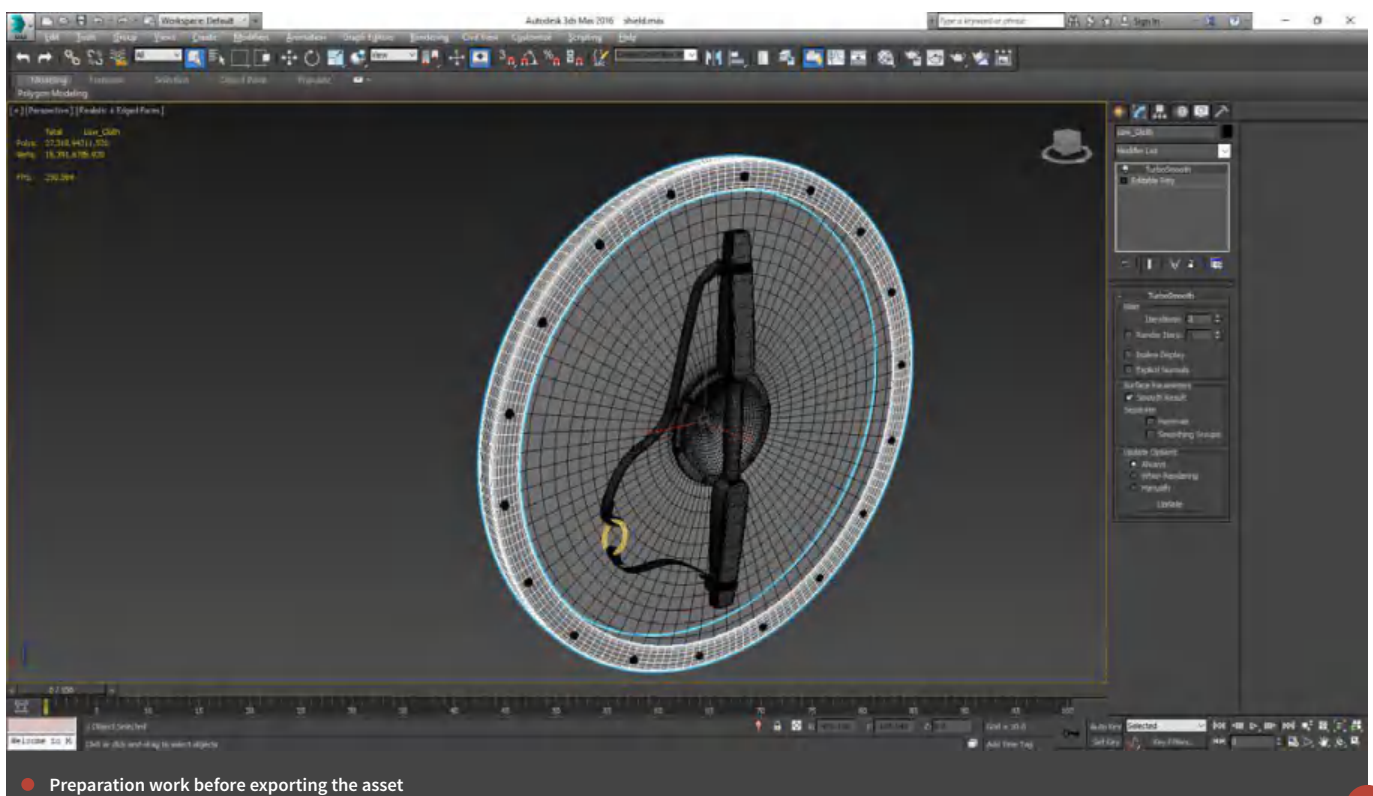
06 Leather ties and ring: I create a second leather strap to tie to the bottom wooden handle. I also model in some leather ties that wrap around the wooden handle, using a Tube primitive with the same dimensions as the spline leather. I deform the shape to give it some history and also tensions as if the leather straps are pulling tight on them. The ends of the leather straps loop back on themselves and rest on the surface, showing that the leather is stitched together and further enhancing the feeling that this asset is a handmade object. I use a small brass ring to hold the two straps together, which will also add some nice spot color and high specular values to the image, giving us a nice contrast to the surfaces.

07 Instancing nails with Array: I create the nails from a simple cylinder with low sides to give a pentagon shape, also chamfering the edge. The nail is quite a small asset but is used a lot on the shield, though as it's small we don't have to worry about making multiple variations of it. I will duplicate them across the shield for now to give us an idea of how it will look, but when we take this asset into ZBrush I will only take one nail, which saves wasting





07



08

time sculpting multiple nails for little benefit. To duplicate the nail precisely in a circle, I place the first nail at the top of the shield in and move its pivot point to the center of the wooden element. Using the Array tool, I give the nail a duplication count of 20, change the incremental rotation on the Y axis to 20 and make sure 'Instance' is

selected. If the Preview button is on you will see the nails duplicated around the shield.

08 TurboSmooth testing: As this asset will be going into ZBrush, I want to make sure it will smooth correctly. You could use plugins such as GoZ, but if you don't have this

available, there's another good way to test your asset to see if it will divide as you expect once it's in ZBrush. For each element that will be exported, add a TurboSmooth modifier and set its iterations to 2. If the elements retain their shape while being heavily tessellated, then the element will be divided perfectly in ZBrush. If for some reason ▶

the element does not maintain its shape, then try adding further cuts along the edges that aren't working right. Delete the TurboSmooth modifier once the testing is finished.

09 Setting up the ZBrush file:

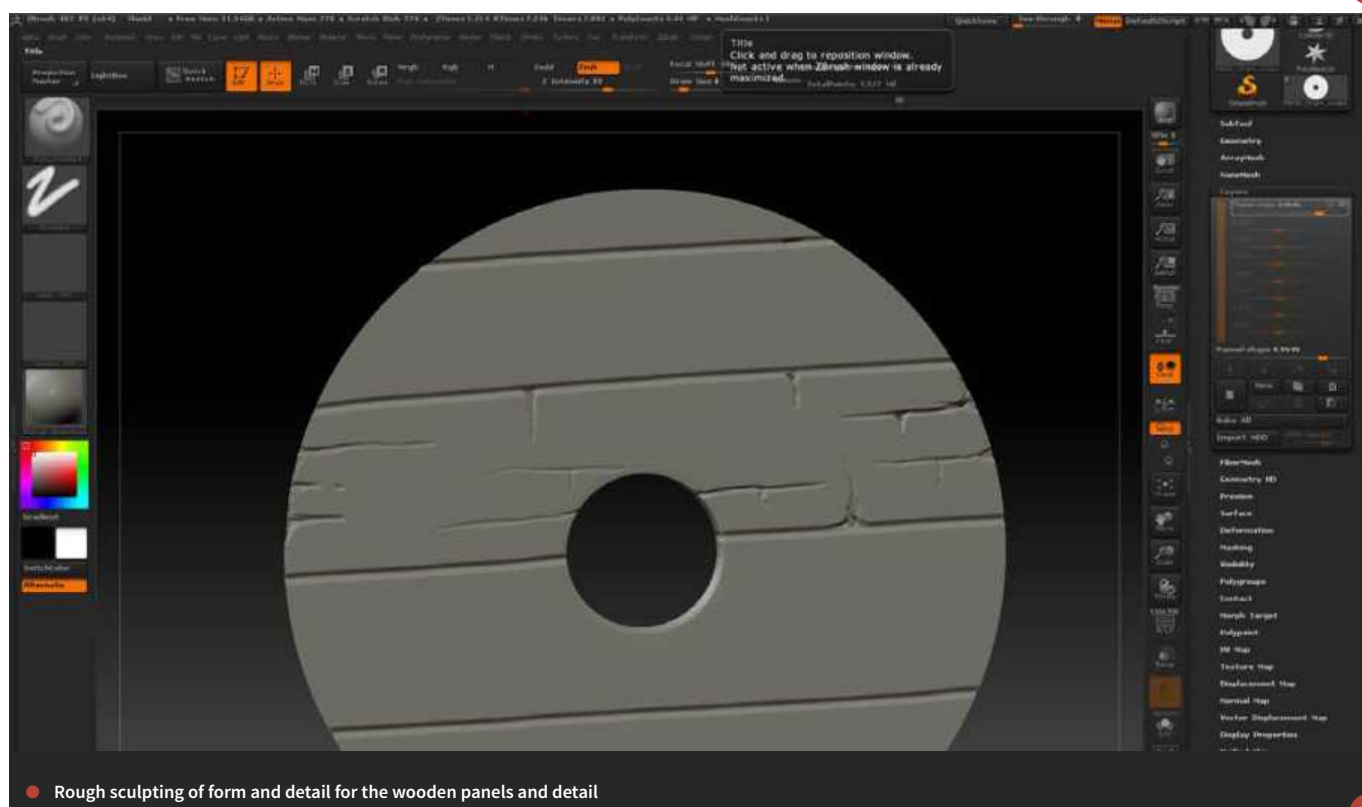
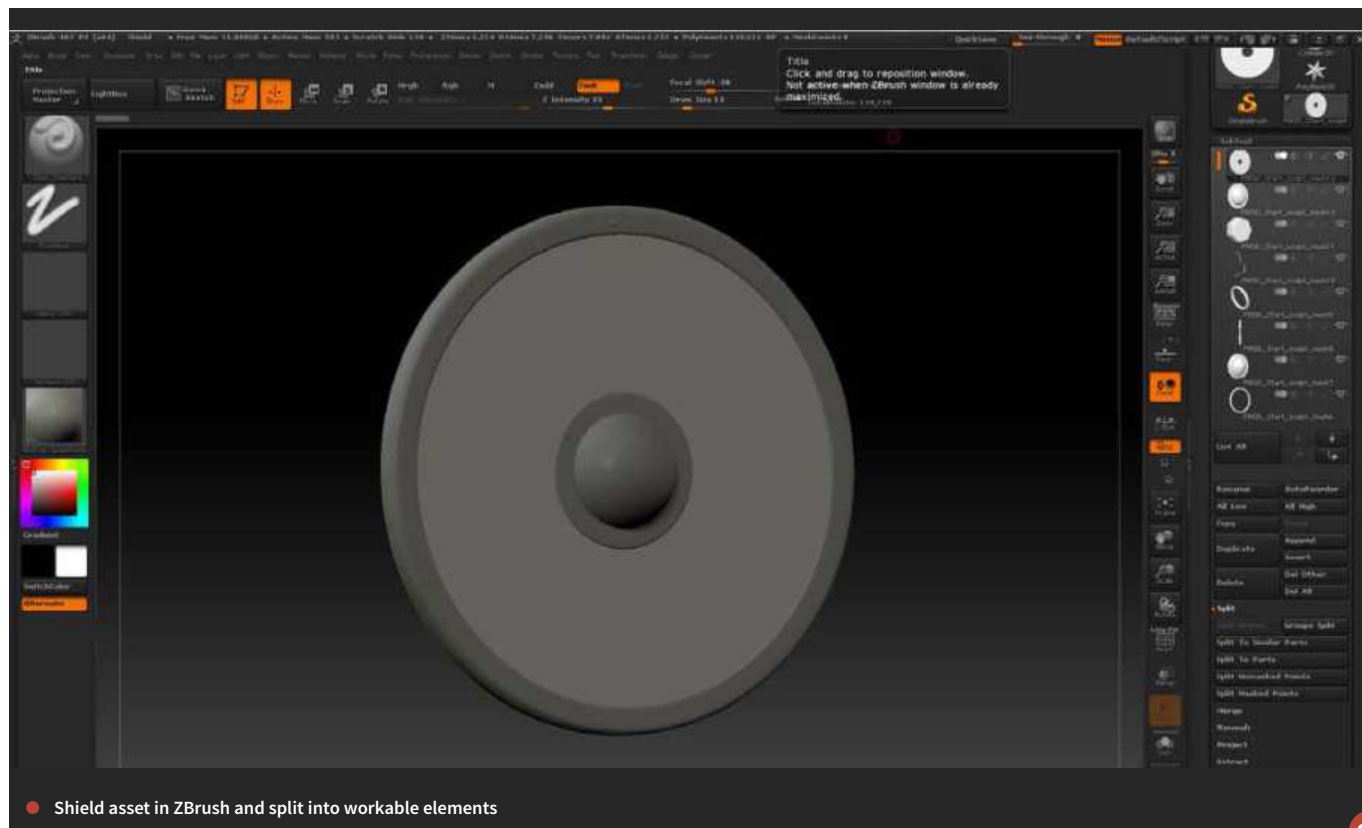
As you can see, I have exported the shield and

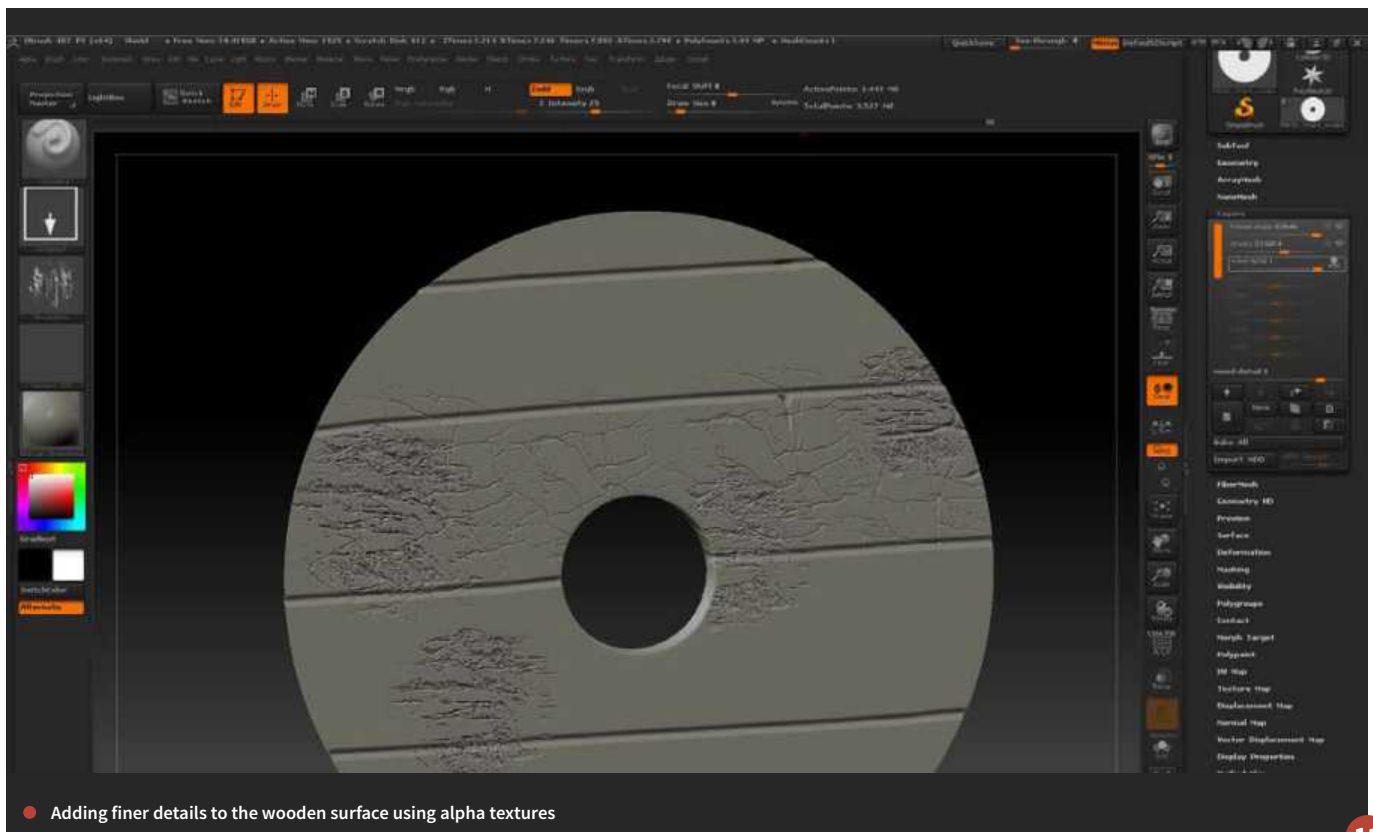
imported it into ZBrush. Note that only one nail has been imported. Before we begin sculpting, we have to set up the asset into a workable format. I want to be able to work on each element individually and show and hide certain elements, so I use the Split tool and select Group Split. This detaches all the elements and places them in the

SubTool window. We can now use this window to hide and select the elements individually without breaking the model.

10 Wooden paneling:

With all the SubTools hidden except the wooden element, I can start to sculpt the wooden panels and



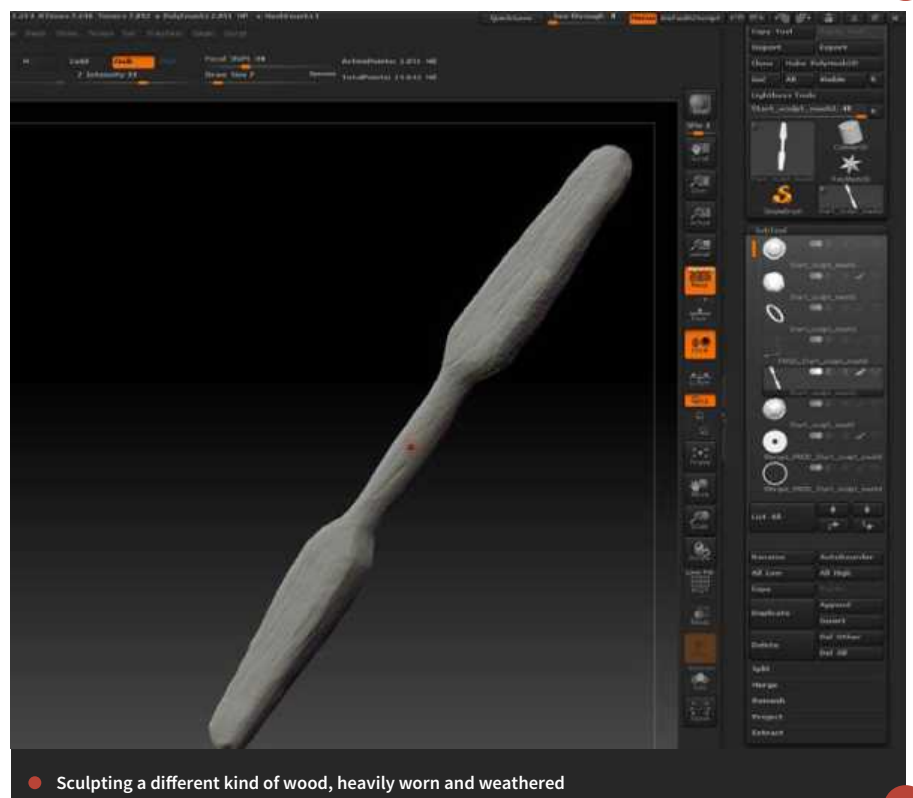


11

wood details. Before I begin sculpting, I create a Morph Target so we can revert sculpts back to the original mesh. I also work in layers so I'm not destroying my previous work. I use the Dam_Standard brush to cut grooves into the mesh to represent the separate paneling and use the Standard brush to carve out some larger wooden detailing. I keep it fairly rough at this stage just to find the right shapes and details.

11 Finer wooden details: I add the finer wooden details using alpha textures on a new layer. These textures can be created by yourself, or you can obtain some nice free ones from the official ZBrush website. Use the Standard brush but change the brush type to DragRect, which will allow us to click and drag the alpha texture onto the surface rather than the normal spray type of brush. Import the alpha texture using the BrushAlpha and make sure it is selected in the brush. You can now click and drag the alphas across the surface to add fine detail. This process can help your imagination and create more ideas to sculpt on the wood, so don't be shy adding the alphas. Remember that we created a Morph Target so we can always revert or soften the new sculpts. All these details are on separate layers and can be faded up and down to suit.

12 Weathered wooden handle: The wooden handle will be very soft-edged and worn because of exposure to the elements

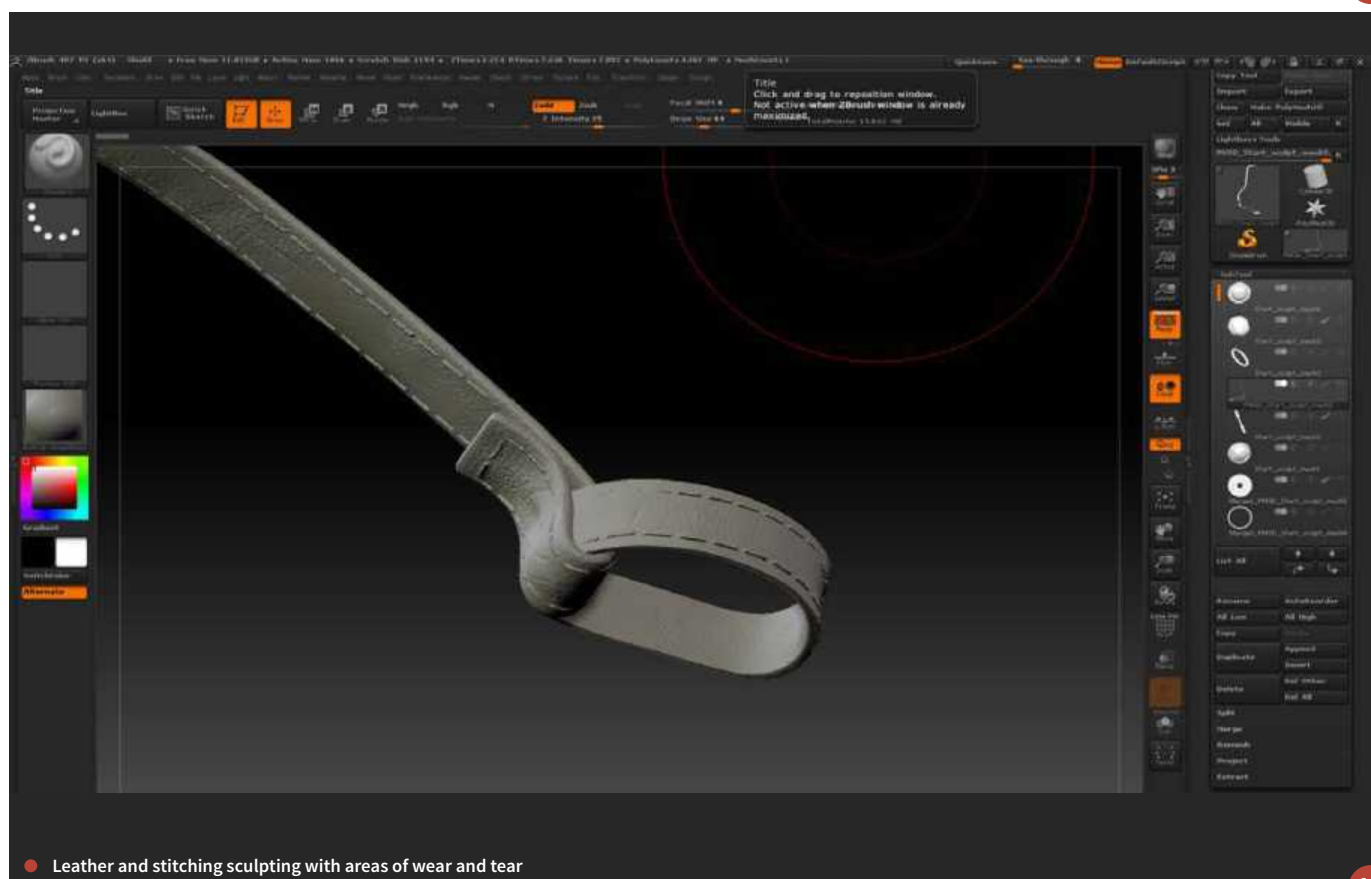
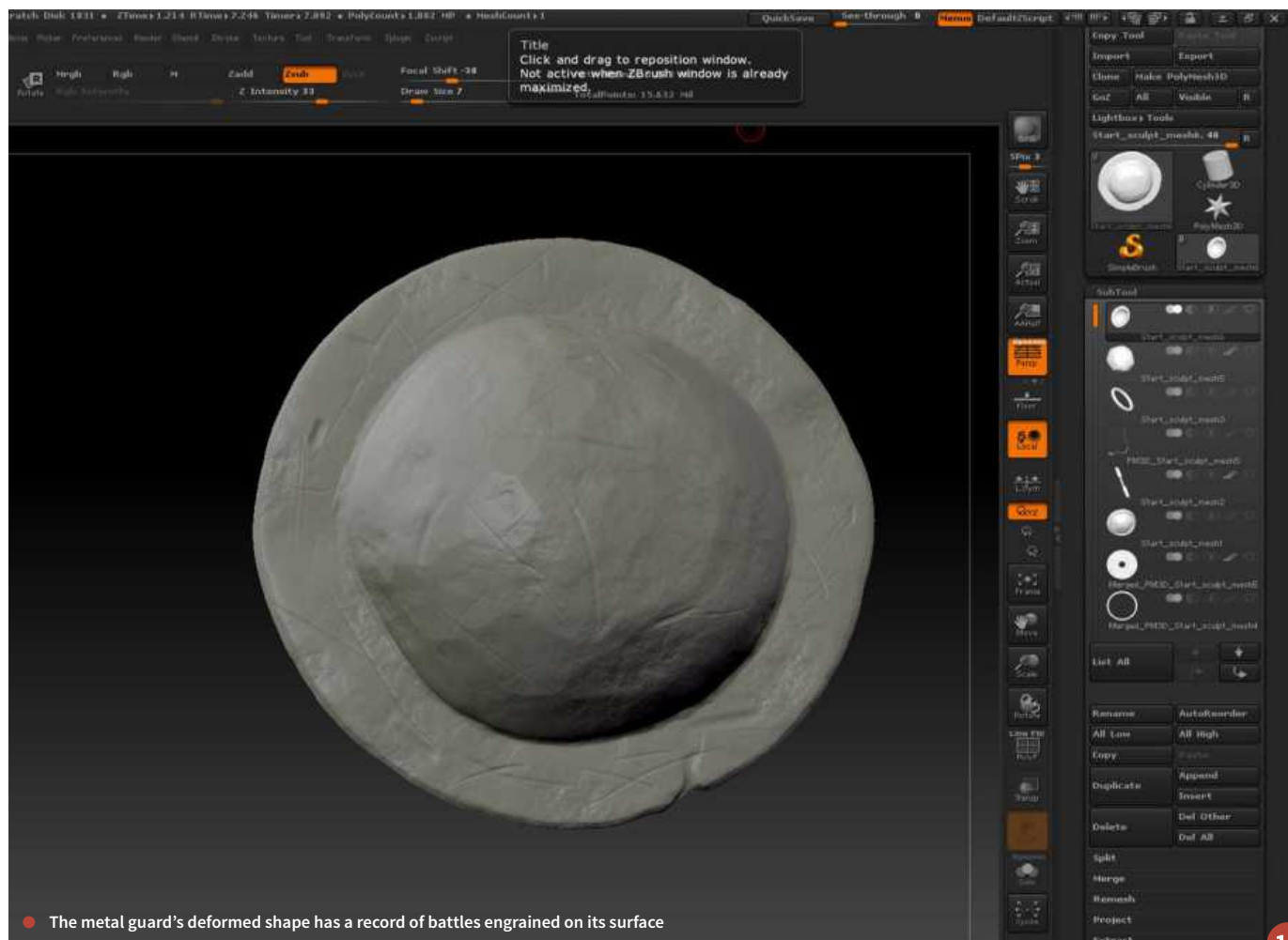


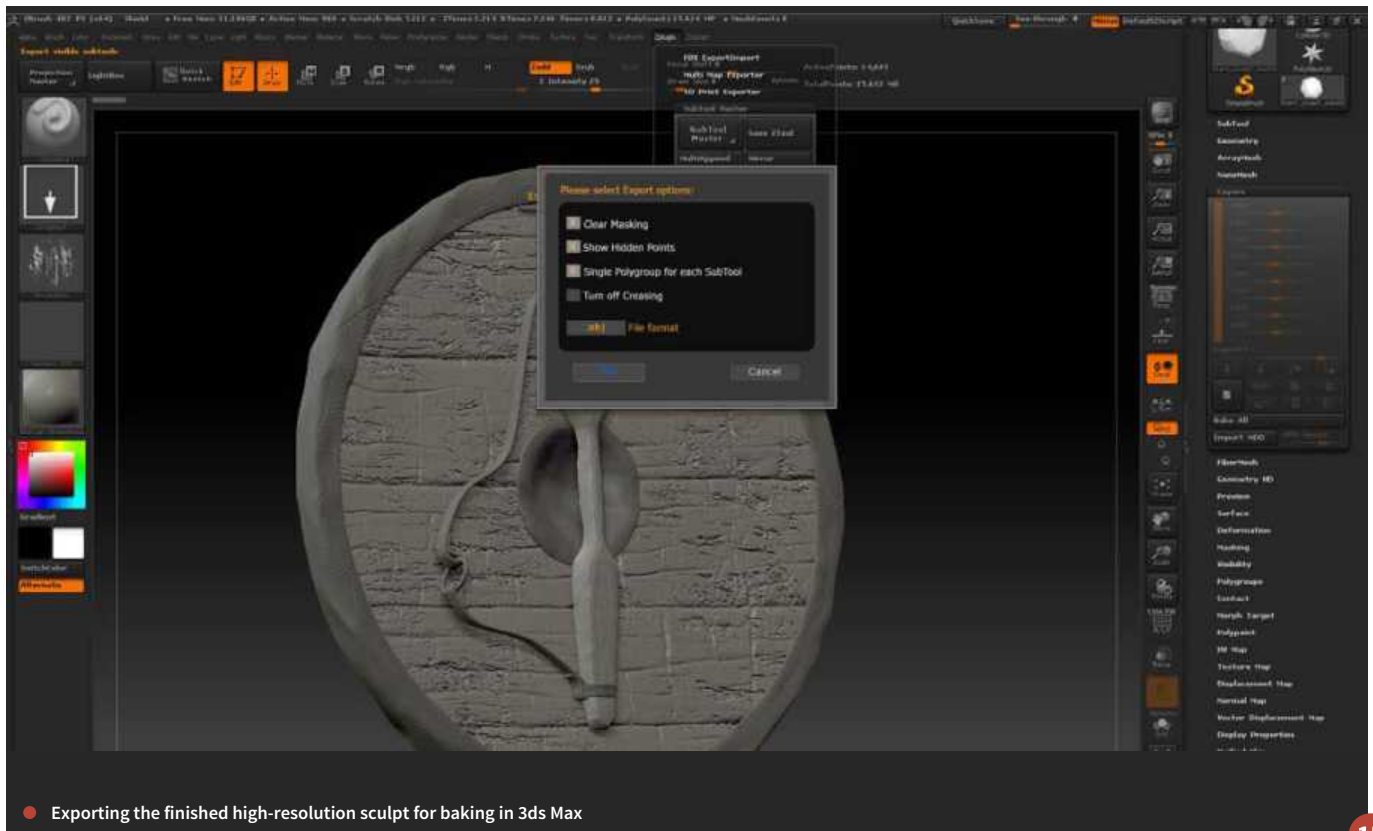
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and heavy physical use, so it is important not to have too much heavy detail in the wood as we did in the main panels that make up the shield.

Use a soft Standard brush to smooth out the surface and the Dam_Standard brush to gently carve long, thin wood grain patterns. On a

separate layer you can add some smaller details using a noisy alpha brush but with a low intensity; if it's too strong we can always reduce the layer's strength to soften the detail. If you want to add some interest and history to the asset you can always add some damage to the handle to show that the shield is a well-battled instrument. ▶





● Exporting the finished high-resolution sculpt for baking in 3ds Max

15

13 Metal hand guard: Using the same steps as for the wood, I use various layers to build up small scratches and chinks in the metal surface. The scratches should have a smaller falloff than for the wood, as a metal surface reacts differently to being scratched. I also used a Standard brush to carve out some chinks and harsh dents in the surface. You can also use the Move brush to re-shape the asset slightly, showing how it has buckled under pressure from heavy use. Re-shaping the spherical shape also creates more interesting highlights once textured. You can also add noise on a new layer using the Surface tab, where you can manipulate a line graph to get the desired result, which is good for rust and general deterioration of the metal.

14 Leather and stitching: The leather surface is sculpted using the same techniques as the wood and metal. I use a noise surface modifier and use the Morph Target to fade the details back to a smooth surface, showing general wear in areas that are exposed to being rubbed or worn down. This variation in the surface will also be reflected in the texturing, giving a nice contrast to the highlights. Add a few scratches across the surface and the thin edging. I also have a high-frequency noise surface to represent the inner detail of the leather, where it was cut to shape.

The stitches are created using a custom alpha texture (which I have provided) and a high level

⚡ TOP TIP

This asset is exposed to the weather a lot and this should be represented in the surfaces, especially the wood as it is quicker to deteriorate than the metals. The asset is also used in battle so you would expect it to be damaged in areas; again these details should be present in your sculpt.

of deformation on a Standard brush. I try not to keep the stitching in a perfect line, as this is a handmade object that would not be as precise as one stitched by a machine in modern times.

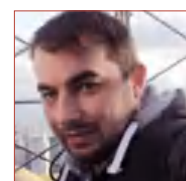
15 Exporting finished SubTools: Once you are happy with the finished high-resolution sculpt, it's time to export the mesh so the normals can be baked in 3ds Max onto a lower-resolution mesh. Using the ZPlugin 'SubTool Master', which you will find in the ZPlugin menu, click Export. I make sure 'Single Polygroup for each SubTool' is selected, as this option exports each SubTool to an individual mesh rather than a large welded-together mesh. It makes it a lot easier to bake in 3ds Max using smaller individual assets. We also want to make sure the file format is an OBJ and click OK. ZBrush will then export the meshes ready for baking in 3ds Max. ●

CHECKOUT CHAPTER 02 ON PAGE 102

Andrew Finch covers UV mapping and baking the asset...



The Artist



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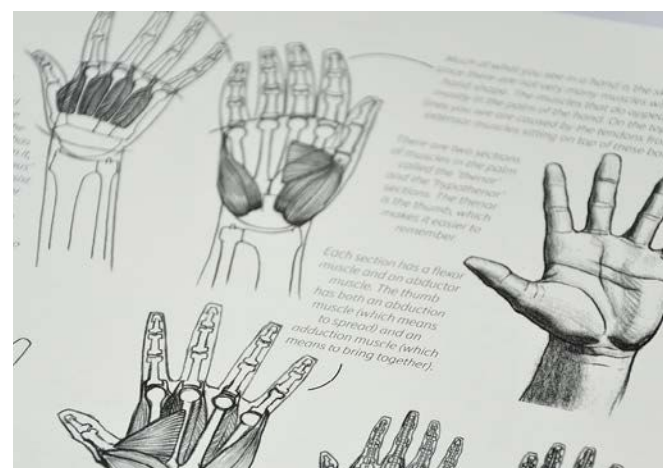
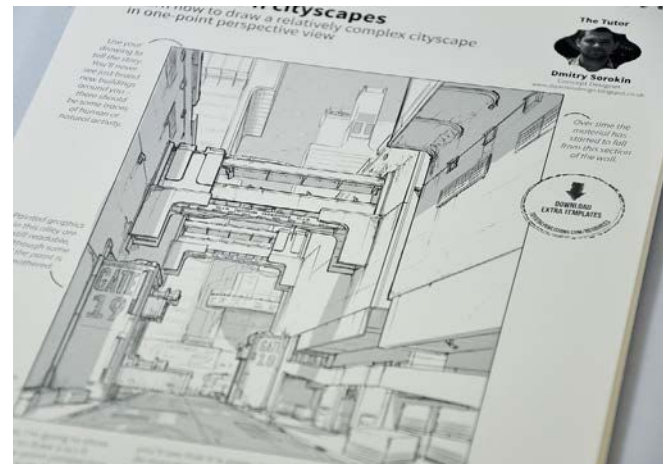
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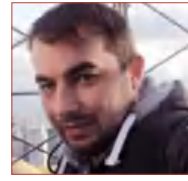




FREE RESOURCES

Model files
Textures

The Artist



Andrew Finch

andrewfinch.carbonmade.com

Software Used:

3ds Max, ZBrush,
Substance Painter

Andrew Finch is a principle environment artist for Microsoft's Rare Studio. He has nine years' industry experience and is currently working on his eleventh title.



UV mapping a real-time asset

by Andrew Finch

Join Andrew Finch as he UVs his 3ds Max asset and bakes maps using mental ray, ready for use in Substance Painter

Learn about UVs and baking with Andrew Finch...

In this tutorial I will guide you through the process of creating a Viking shield inspired by the TV show *Vikings*. In the last tutorial we modeled a low-poly version of the shield in 3ds Max and imported it into ZBrush for the high-poly sculpt. In this tutorial we will UV map the lower-poly version of the shield and bake out the high resolution details to a normal map. I will briefly go through the UV and baking stages as these processes are widely covered in other tutorials available on the internet; the main focus of this tutorial is introducing Substance Painter into your workflow.

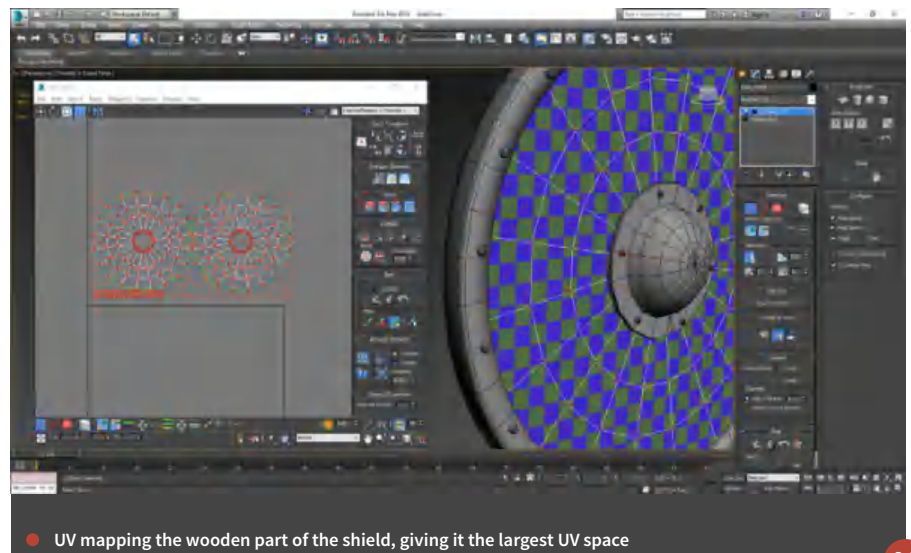
For the texturing process I will briefly start in Photoshop but mainly focus on Substance Painter to create a high quality PBR texture set. All these assets we create will then be imported in Marmoset Toolbag 2 and set up in a quick scene to show off our model, but instead of rendering out still images for your portfolio I will show you how to use the new Marmoset Viewer tool to create an interactive portfolio piece, which is a new very impressive way to display your artwork to potential employers, giving them the ability to examine your asset interactively.

01 Mapping the wood: To map the wooden panels of the shield, I planar map the front and back polygons, making sure the UV islands are the same size and ensuring they have the same pixel density when texturing.

I like to apply a checkerboard material to the UV-mapped assets, which visually shows me if there are any parts of the mesh that are skewed and need fixing. As this asset is planar mapped it should be fine. Move the UV islands out of the 0-1 mapping space so they are out of the way. This makes it easier to select the individual elements once we combine the mesh later.

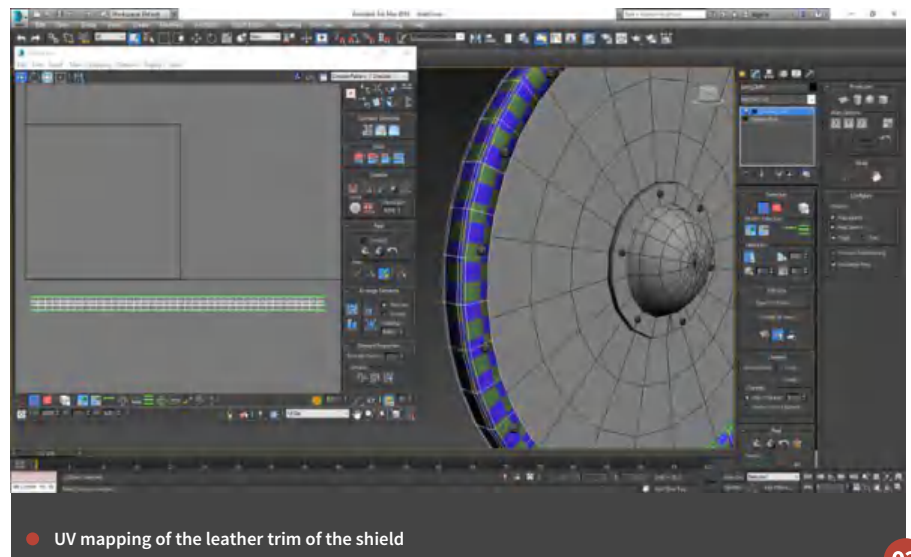
02 Mapping the leather trim: Use cylindrical mapping to start unwrapping this asset, which will give you a good base to start off but will require some tweaking. Use the Relax tool to relax the UVs to reduce distortion as much as possible. I also like to straighten the edges by selecting a row of UVs and clicking either the horizontal or vertical alignment tools to snap them altogether in a straight line. You should be left with a straight line of UVs and this will make texturing the diffuse later on much easier.

03 Hand guard mapping: Even though the metal hand guard is a spherical asset we



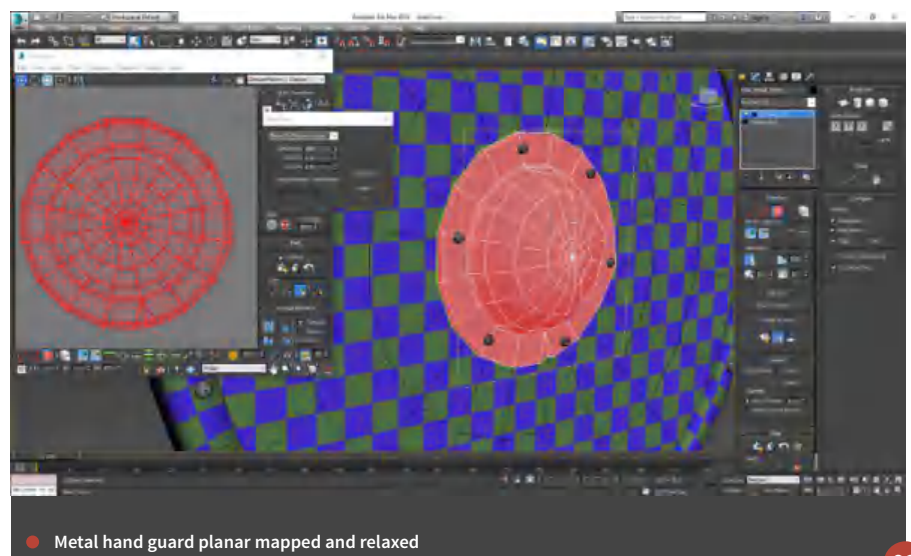
● UV mapping the wooden part of the shield, giving it the largest UV space

01



● UV mapping of the leather trim of the shield

02



● Metal hand guard planar mapped and relaxed

03

can get away with planar mapping it and again using the Relax tool to smooth out the distortion. Select all of the faces and apply planar mapping. With the faces still selected, apply the Relax tool. There are a few options you can choose

from here, so play around with them to get the best results, using the checkerboard material as a visual guide to aid you in getting rid of the distortion. Don't forget to move the UV island out of the way for easier selection later on. ►

04 Mapping a complicated shape:

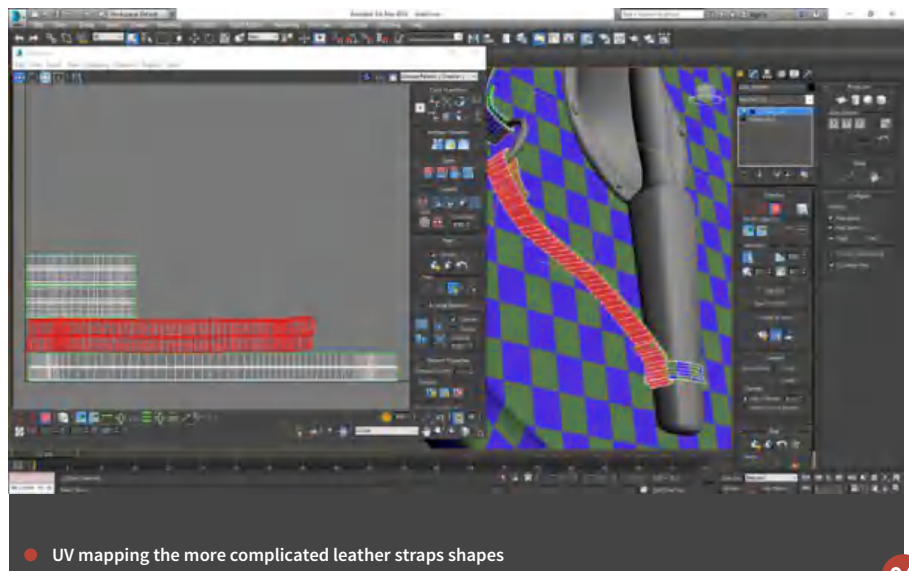
The straps are quite a complicated shape – they loop around and double back on themselves, making it very easy to get warped UVs. I sometimes use spline mapping for UV shapes like these but in this instance it doesn't work for me. It's a case of trial and error to get the best results. I find the best method is doing an automatic unwrap of each strap and then using the Edge Stitch tool to weld each individual UV island back together. Once I've edge stitched all the islands back together I use the UV alignment tool again to straighten up the vertical and horizontal UVs so they are squared off. Then I use the Relax tool to smooth out any warped UVs. Do the same for each of the remaining straps.

05 Packing the islands: With all of the separate elements now UV mapped, it's time to pack them within the UV space. Select all of the assets that make up the shield and apply a UV modifier, which will allow us to work on all of the elements' UVs at the same time. Make sure that when each element is UV'd, we move it away from the 0–1 space, leaving it empty. Having done that we can now easily select each element's UVs and move them into the UV space without any or overlapping. Pack the UVs to maximize the UV space, ensuring we get the best possible pixel density for our textures. Keep an eye on the checkerboard material and make sure that the squares all remain roughly the same size, as we want the same resolution across the asset.

“Working with high resolution meshes can be quite a performance drain, so to make our lives easier we'll bake them in isolation, speeding up performance”

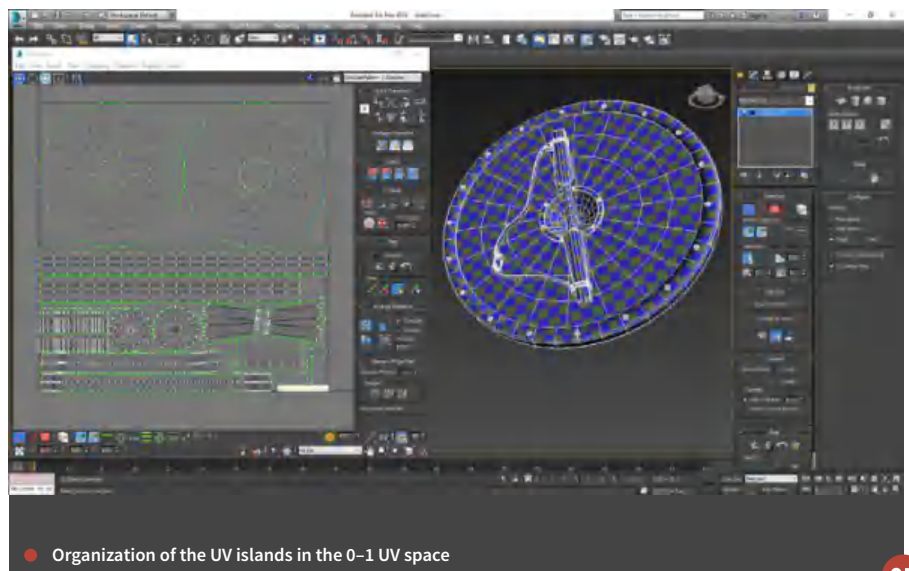
06 Naming conventions: Working with high resolution meshes can be quite a performance drain, so to make our lives easier we'll bake them in isolation, speeding up performance. To do this we have to be organized, so name each of the low resolution meshes with a prefix of LOW_, for example 'Low_Leather', and the corresponding high resolution mesh will have the same name but with a prefix of High_, for example 'High_Leather'. This is also useful if you decide to export the individual meshes for baking using xNormal or another third-party baking tool. For this tutorial we are baking using mental ray in 3ds Max.

07 Render to texture: To bake the normal map data from the high resolution mesh we use 'Render to Texture' in 3ds Max. With all of the assets hidden in the scene, unhide one asset



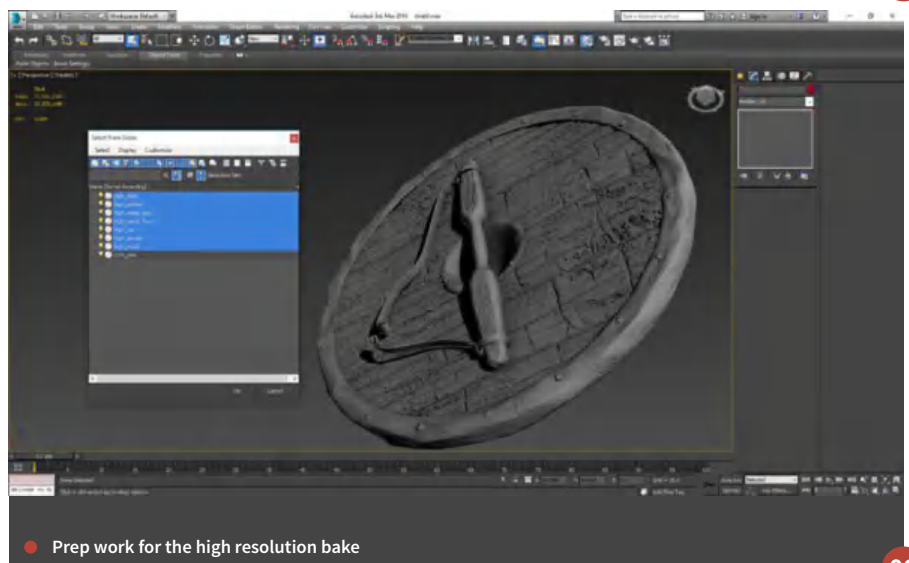
● UV mapping the more complicated leather straps shapes

04



● Organization of the UV islands in the 0–1 UV space

05

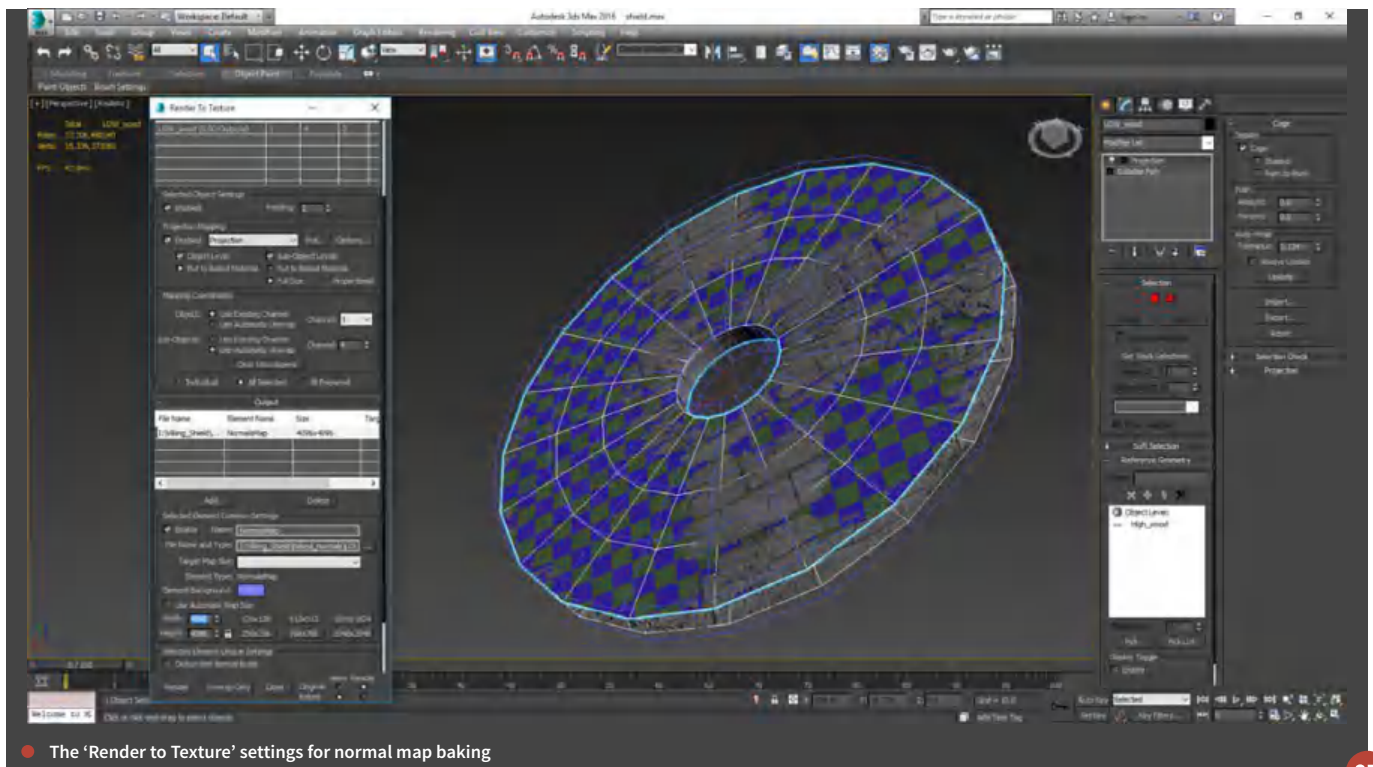


● Prep work for the high resolution bake

06

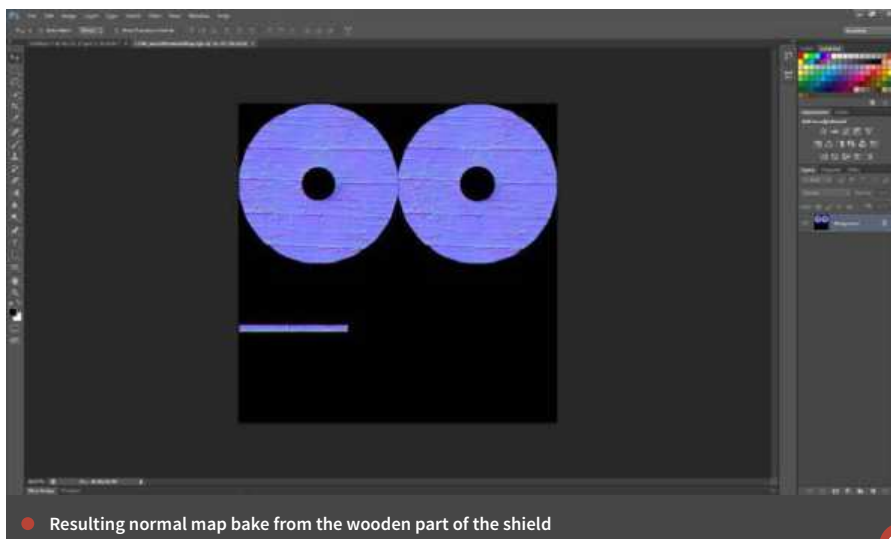
group (in this image I have unhidden 'Low_Wood' and 'High_Wood', with the Low_wood asset selected), then go to the 'Render to Texture' dialogue. Change the mapping coordinates to

'Use Existing Channel' and make sure it's set to UV Channel 1. Under Projection Mapping, make sure it is enabled, click Pick and select the high resolution mesh.



● The 'Render to Texture' settings for normal map baking

07

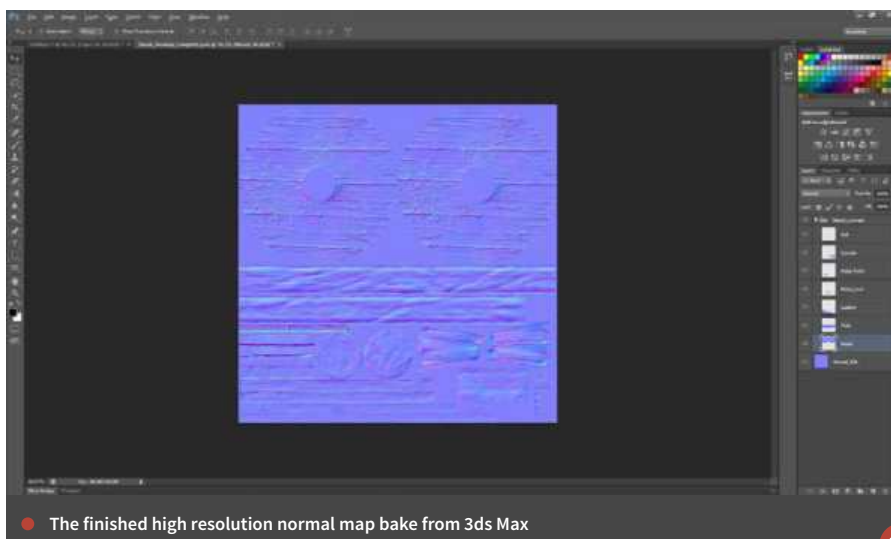


● Resulting normal map bake from the wooden part of the shield

The Output rollout is where we say what we want to render out, so click Add and select Normal map for the resolution. I want it to be as high as possible so choose 4096*4096. Before you hit render, check the viewport and you should see a blue cage around the asset. This is the projection mesh, and you need to make sure it surrounds the high resolution mesh as much as possible, but without it being too far away, so reset the cage mesh and use the push settings to enlarge the cage slightly.

08 Resulting normal bake: As you can see in this image, the normal map for the wooden part of the asset has baked successfully. The normal map detail has baked through quite well and at a good resolution. Now you can go through all the remaining assets repeating the same procedure, saving out the high-res normal map bakes to different files so we can combine and edit them later.

09 Finished normal map: Here is the resulting normal map with all the individual elements combined in Photoshop. The composited image has a background color of 128, 128, 255, which gives you a flat purple color with no normal map data to interfere with our baked maps. All the separate baked maps can now be imported to the PSD as separate layers so they can be worked on individually. Set the layer type to Overlay to make sure the layers blend together nicely. If a part of the asset's normal map is too strong, you can now simply use the layer's opacity to tone it down. ▶



● The finished high resolution normal map bake from 3ds Max

09

10 Applying the normal map: Back in 3ds Max, combine the low resolution meshes into one asset and apply a new blank material. In this material, give it a flat color, nothing that's going to distract you from viewing the normal map. In the bump slot, apply a Normal Bump material and locate your saved combined normal map PSD. Make sure the bump map has 100% Strength so you can see the full normal map. Now it's in 3ds Max you can look for any errors or overly strong areas that you can tone down or paint out. We can make changes in Substance Painter later, but it's best to do this now if anything is spotted.

11 Ambient occlusion bake: I like to bake out an ambient occlusion (AO) map using mental ray in 3ds Max. I like the results it gives me and we can also use this map in Substance Painter later to help us with texturing. Substance Painter does bake out its own AO Maps, which are very quick and do a good job, but I just like mental ray's versions better. With the asset selected and 'Render to Texture' open, add an AO element and make sure 'Using Existing Channel' is set to 1. I set the resolution to 2048 as this will be good enough for our asset, and I also set the samples to 1024. This will increase rendering times but the quality will be much better and I don't mind waiting.

12 Baked ambient occlusion map: In this image you can see the final AO bake from mental ray. The image is very clean and you can see nice falloffs of light and dark. Notice how the normal map has also played a part in the rendering and the deep normal map data has been occluded (darkened), helping to improve the detail and realism in the textures later on.

13 Adding the wood texture: I render out the UVs from 3ds Max to use as a guide for our texturing. I also bring in the AO map to help me see where the details are. Using textures.com I found a suitable wood texture – in this case, an old weathered wood will suit us. I then use the UV map to make sure the wood details are lined up correctly. I also add the wood for the handle.

I texture the wood in Photoshop so I can show you how to import an already-made texture into Substance Painter ready for tweaking. I add a bit of damage to the handle so I can also show you how to make changes to the normal map in Substance Painter.

14 Importing assets in Substance Painter: With a new scene open in Substance Painter, click File > New Project, which will open up a window to import our assets. Import the combined mesh asset by



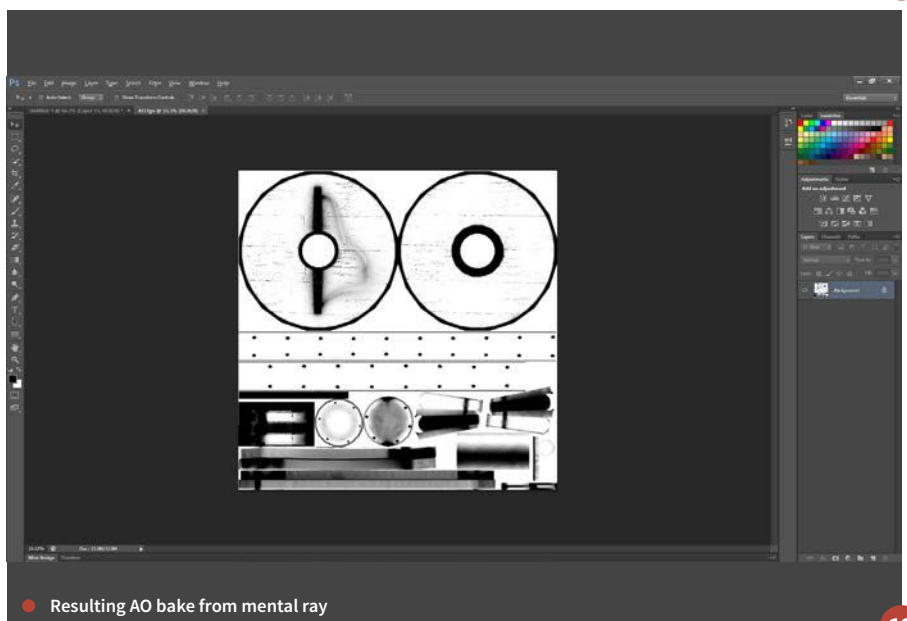
● View the normal map in 3ds Max for signs of errors

10



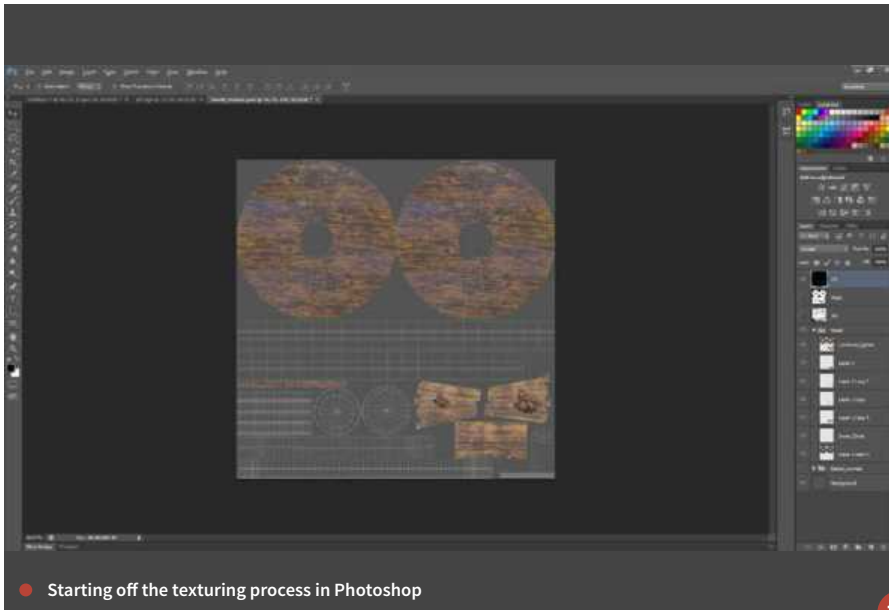
● Rendering out an AO map in 3ds Max using mental ray

11



● Resulting AO bake from mental ray

12

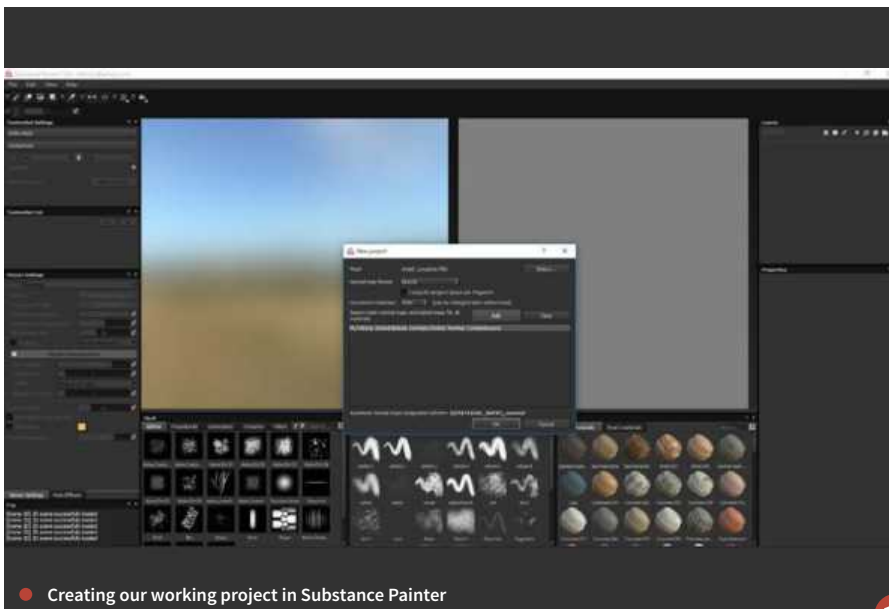


Starting off the texturing process in Photoshop

13

clicking select and navigating to it. Substance Painter uses the FBX format for meshes. I set the document resolution to 4096, but this can be reduced or increased on the fly, which can help with performance issues when dealing with large scenes. Click the Add button to import the normal map PSD and also the AO map. Click OK and Substance Painter will now import your assets and place them in the correct locations for you.

15 Ready for texturing: First we need to add our normal map to the material. Under TextureSet Settings, scroll down to Additional Maps and select the Normal map. This pops up a small window with your imported textures, where you can select your normal map. This will now be applied to your asset. Do the same for the ambient occlusion. Substance Painter will now use these maps when generating its Substance materials for dirt and grime, etc.



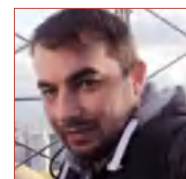
Creating our working project in Substance Painter

14

I like to change a few Viewer settings before I start working. I turn down the Environment opacity to 0 so the background doesn't become too distracting while texturing. I set the AO Intensity to 1 and Quality to high. I also sometimes switch on the Shadows, but this can distract from texturing, so I tend to flick this on and off just for testing purposes. To apply our diffuse texture to the asset, add a new Fill Layer.

This new layer is given PBR settings, Roughness and Metallic, which we need to adjust to represent the wood texture. Make sure Height is at 0, Metallic is black (off) and Roughness I set to 0.3 (I find this number gives the best result for the type of wood I want to achieve). This has now set up our working file in Substance Painter and we can begin texturing in the next tutorial. ●

The Artist



Andrew Finch
andrewfinch.carbonmade.com



Substance Painter scene setup ready for texturing

15

NEXT ISSUE
Andrew Finch guides us through texturing and rendering the asset

The Artist



Ryan Reid

ryanreid.artstation.com

Software Used:

Maya, ZBrush

Ryan Reid is a 21-year-old artist currently studying 3D graphics and product design at the College for Creative Studies.



Realistic hair with Maya and ZBrush

Talented 3D student Ryan Reid shares his techniques for creating a detailed human character with braided hair ▶

Learn some sculpting and hair tricks from Ryan Reid...

My name is Ryan Reid and I am currently a senior student in college studying 3D graphics and design. I started drawing at the age of two. My father introduced me to 3D software at the early age of seven, and I have been studying and practicing my craft throughout my education ever since. I will be showing some of my processes for the creation of my image, *Mondus*.

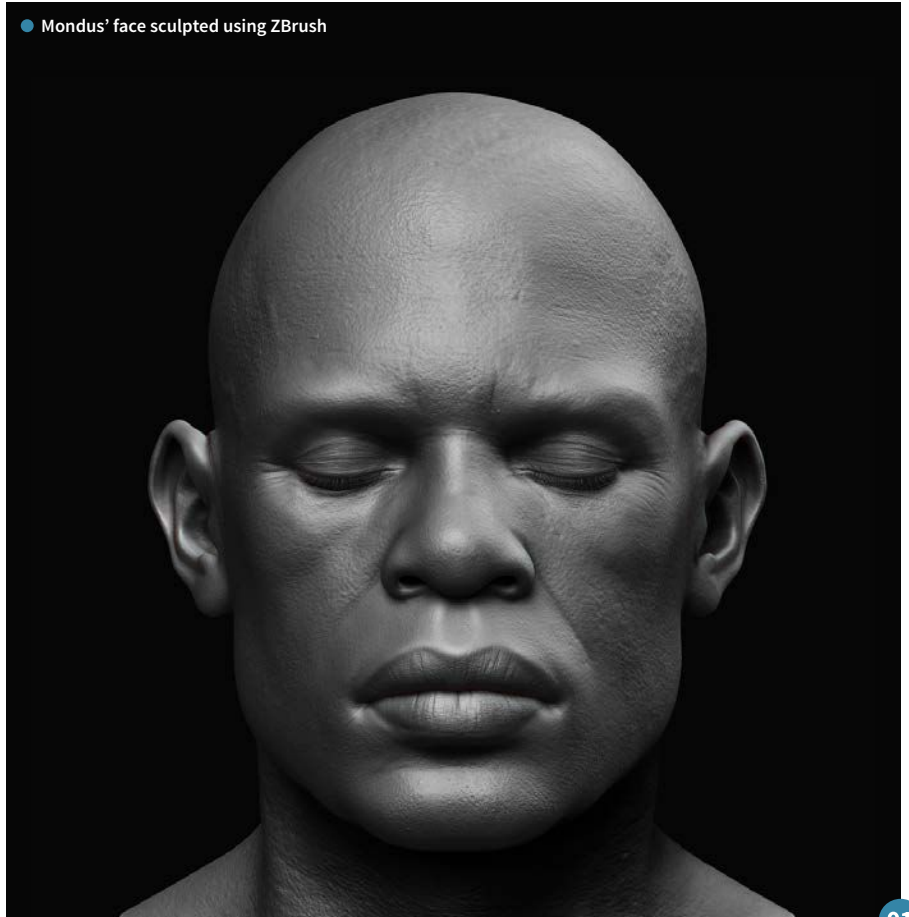
Before I dived into modeling *Mondus*, I wanted to find something that the CG community hadn't tapped into. I did some brainstorming and concepting in ZBrush first and then chose to create an African male with achromasia (otherwise known as albinism). I did some research on how it is caused and it is basically an inherited disorder characterized by little or no melanin production. I came across a public figure whose name is DeeJay Jewell, whose features were unique, so I gathered references on him as well as other African albino figures before beginning to sculpt.

01 Sculpting: I started out the head sculpt from a sphere and went through many changes until I got a good base. Once I was happy with my base mesh, I moved to secondary forms, which were subtle wrinkles and asymmetry. After my secondary forms were completed, I started my tertiary detailing. For this step I used scan data alphas from Surface Mimic. I also did a lot of manual work using the Dam Standard brush for tight wrinkles and lip detail. For my main sculpting brush, I used the Clay Build Up brush.

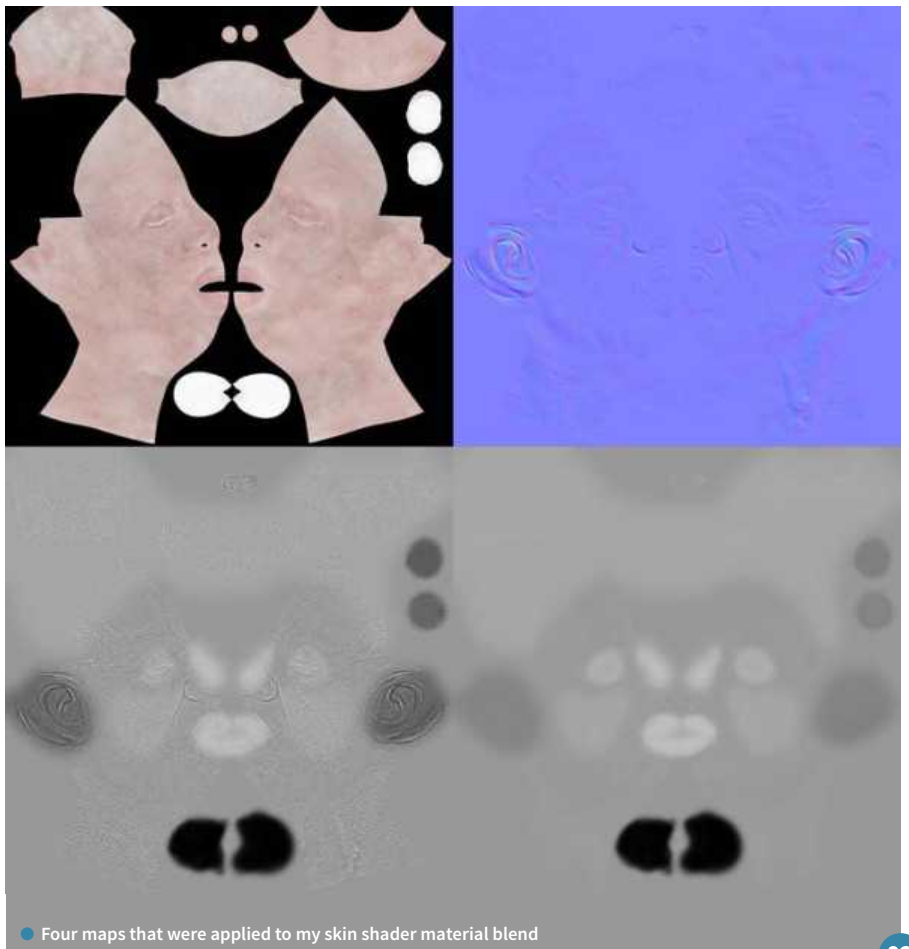
“Once I created the ambient and cavity map, I combined them together in Photoshop to create my specular map. I then painted darker areas and lighter areas, which then became my roughness map”

02 Texture maps: I created my diffuse texture map in MARI by projecting photo images onto my Head model. My normal map was from ZBrush since all the tertiary detail was created there. Once I created my normal map, I generated an ambient occlusion map and a cavity map from my normal map with an action script I used in Photoshop. Once I created the ambient and cavity map, I combined them together in Photoshop to create my specular map. I then painted darker areas and lighter areas, which then became my roughness map. ▶

● Mondus' face sculpted using ZBrush



01



● Four maps that were applied to my skin shader material blend

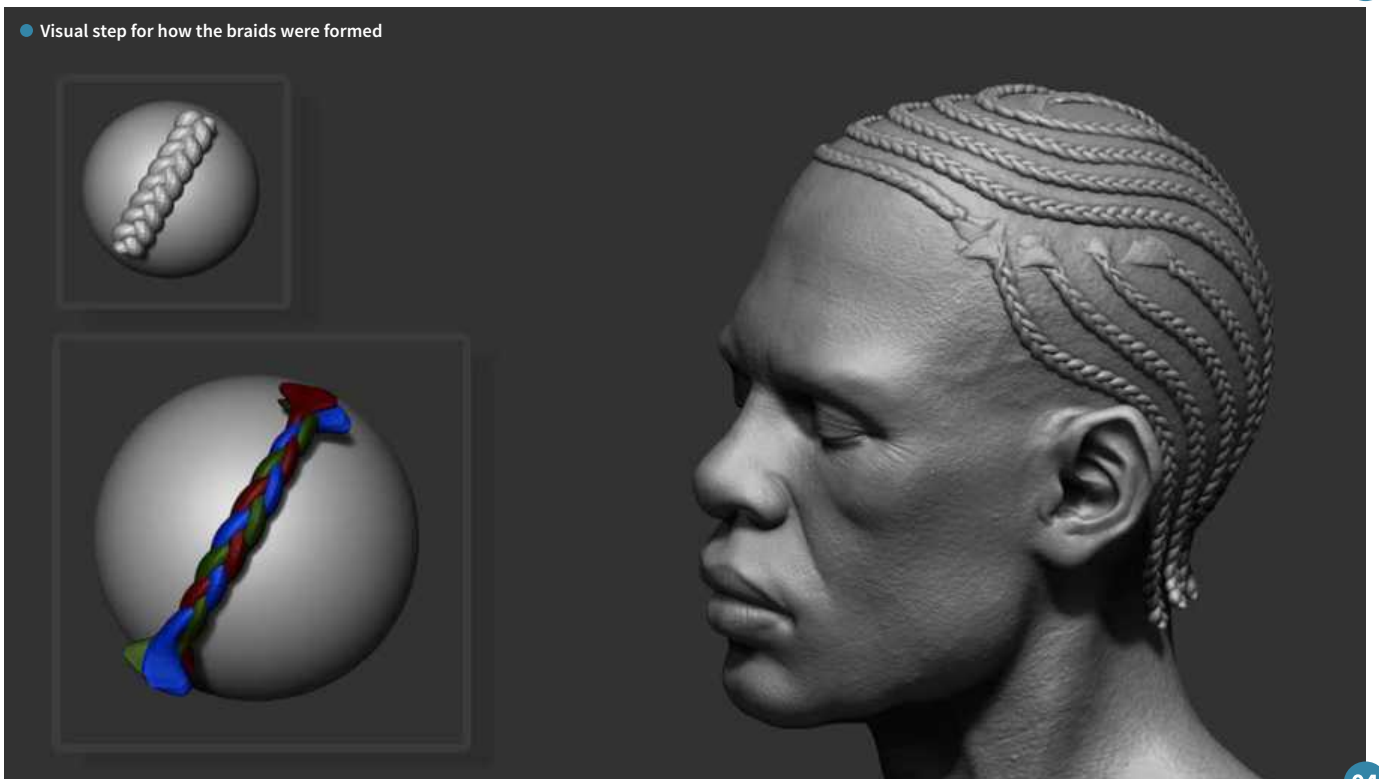
02

● Showing how the skin shader works with a simple light rig



03

● Visual step for how the braids were formed



04

03 Skin shader: For my rendering engine, I used V-Ray. After I created my V-Ray shader connections with different material blends, I then created a light rig to show how the skin shader reacted. Before you light your scene, I would suggest creating a simple light rig to show how the skin shader is reacting under different light intensities. Your skin shader should be able to look pretty good in any type of lighting situation. Using different HDRI images is also good for testing your skin shader. For example, I used one V-Ray rectangle light that did a 360 around my model.

04 Hair modeling: For the next step I decided to take on a unique design for braided hair. I started out by creating a three-part

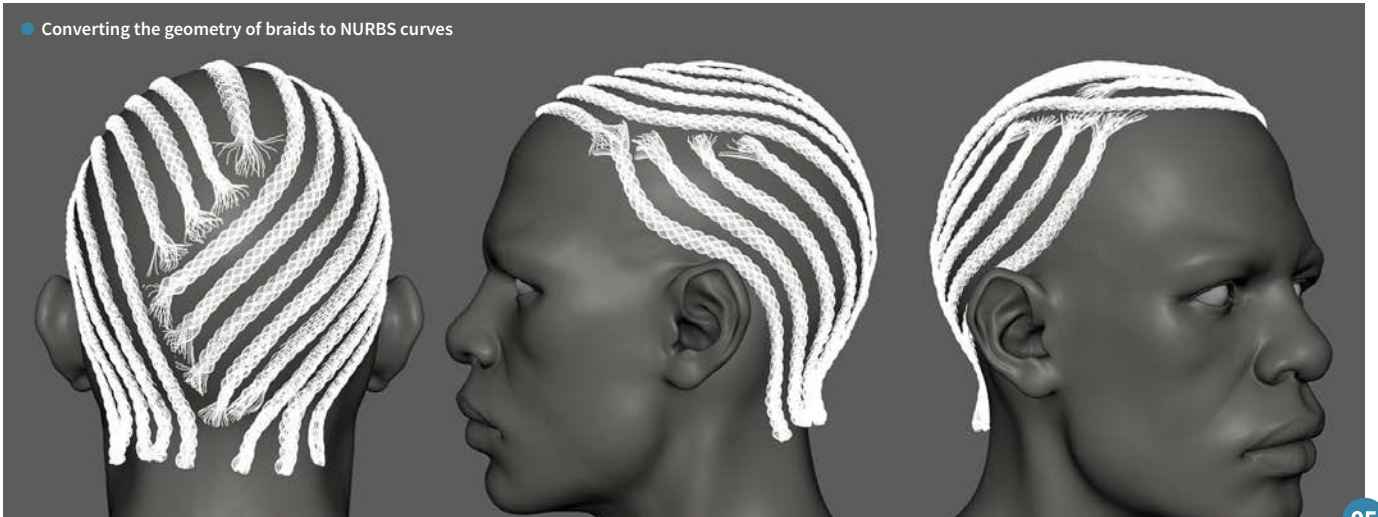
braid in Maya, then converted the geometry to an IMM brush, which was done in ZBrush. Once I created the brush, I drew on my model where I wanted the braids to be placed. Once placed, I then Polygrouped the hair geometry and created fanning to the root of each sub-braid. This way, when I generated the hair in Maya, each root would look different and feel well-rooted.

05 Extract curves: For this step my hair geometry is now in Maya. I extracted NURBS curves from each sub-braid and there you have it: a perfect set of braided hair guides. I applied Maya's nHair system and used a V-Ray hair material as the override shading for the hair system. I distributed a couple of nHair systems to random sub-braids, which were named and

grouped in the outliner, which allowed me to select any sub-braid curve group and apply accordingly for extreme breakup.

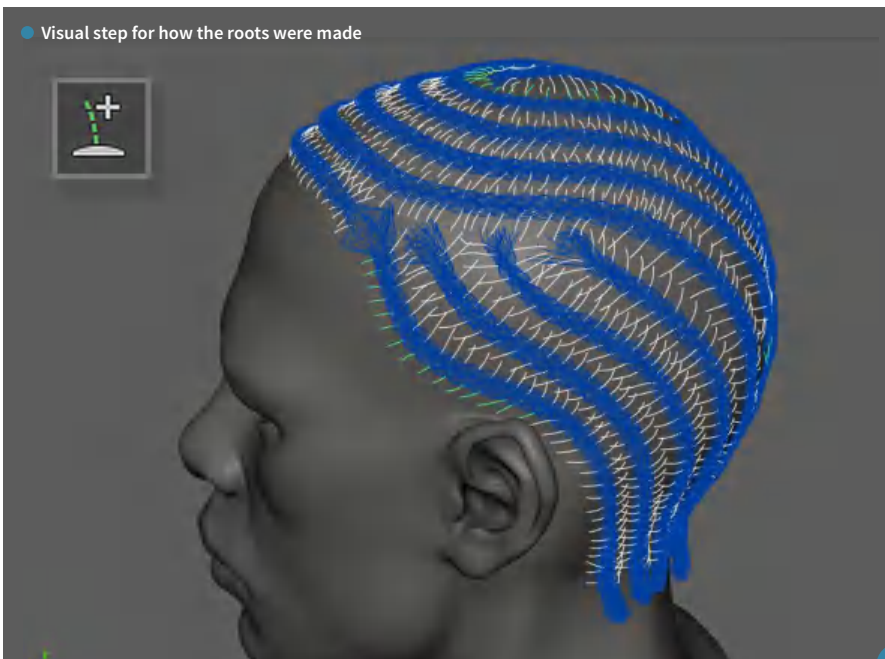
06 Root hairs: After I converted the braids to NURBS curves, I had to create individual root hairs in-between the braids in order to convey how tightly they were braided. For this step I used XGen, which is a new hair-generating system that was introduced in Maya 2015. In Maya 2016, there is a new function called 'Add or Move Guides', which I used to add each root hair individually. One of XGen's special functions is its interpolation of figuring out the directionality of the hairs. I can simply place each hair curve without rotating them in the right direction. Using XGen saved me lots of time

● Converting the geometry of braids to NURBS curves



05

● Visual step for how the roots were made



06

for this step. I made sure each root guide curve penetrated the braid curves, so when I added an nHair system to the root hairs later, the render would give off a fake blending between the root hairs and the braided curves.

07 Hair result: After I successfully created the braids and roots, I then had to create loose curly hair for his hairline and shaved beard. I used Fibermesh in ZBrush to spawn the hairline and shaved beard. It's a very straightforward process; I simply masked off where I wanted the hair to spawn and tweaked the parameters in the Fibermesh UI to give the hair a wispy curl. Once I completed the hair with Fibermesh, there's a pull-down menu that allows you to export the Fibermesh as curves. I then created another nHair system to spawn nHair in place of the curves from ZBrush. Due to the density of African hair, the overall nHair count was pretty harsh, but it gave me a stunning result. ●



● Showing the GI and Specular channel of the nHair

07

The Artist



Ryan Reid

ryanreid.artstation.com





NEXT MONTH

Texturing spacecraft in
3ds Max and Maya

Creating an asset for Marmoset Viewer

Inspiring ZBrush sketches

10 of the best 3D images from
around the world

Plus much more!



3dcreative

The Artist



Zeno Pelgrims
zenopelgrims.com

Software Used:
Maya, ZBrush

Zeno Pelgrims is a student currently completing his last year at Bournemouth University. He's probably waiting for some uncompleted render buckets!



Create exciting cartoon scenes

Learn how Zeno Pelgrims made the brilliant *Path Tracer*, from loosely sketched concept to final 3D illustration ▶



Get an insight into Zeno Pelgrims' workflow...

01 Concept sketching: For this image I actually 'drew' (scribbled) out a concept, something I don't do for every project. Because I knew I wanted to work with fisheye lens perspective, I felt the need to see if it would work.

However, I made the mistake of not testing the dragon in 3D. When using a weird lens, don't think you can anticipate the effect, let alone paint it. Test it out in 3D and save yourself a headache or three later on...

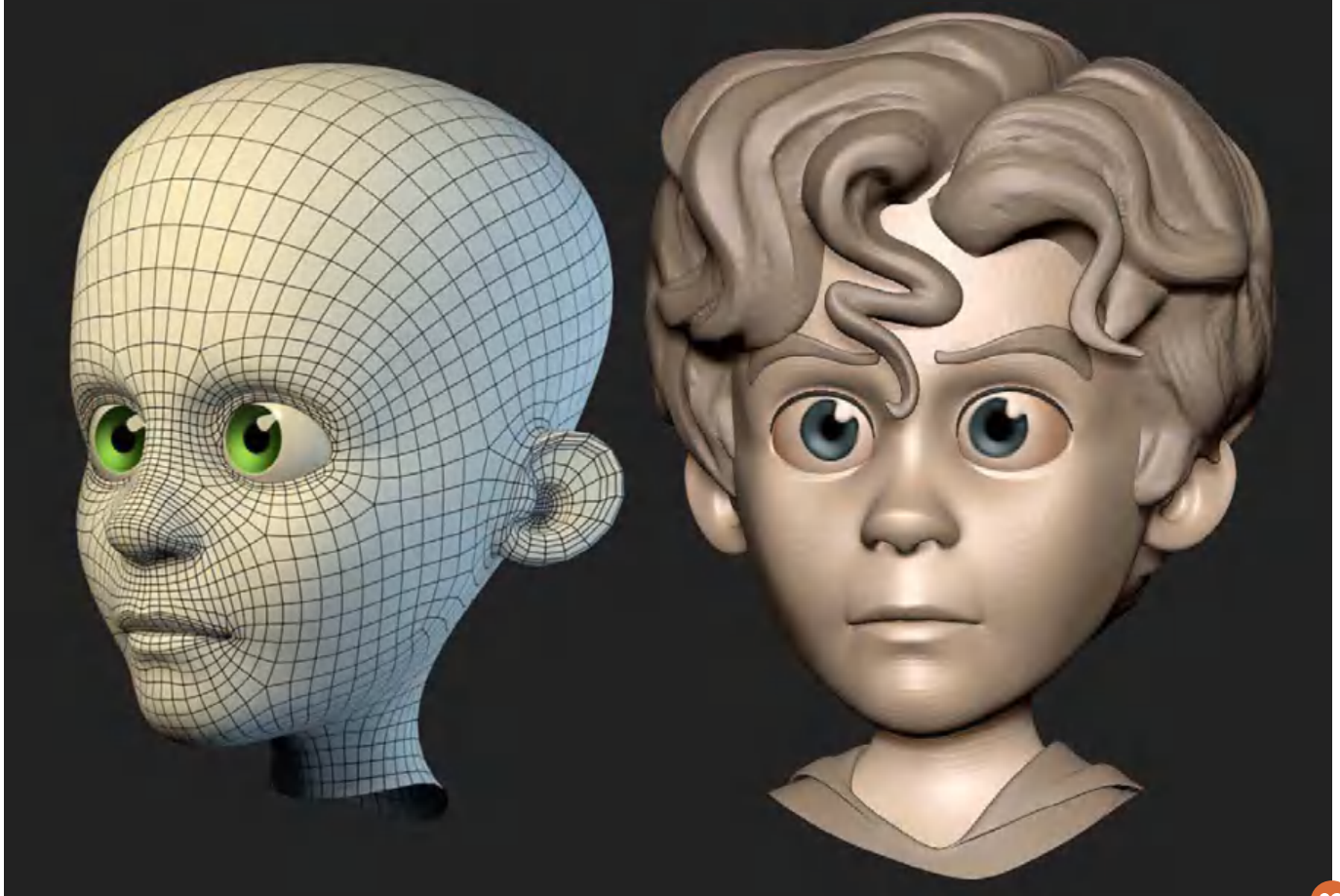
02 Sculpting the kid: Retopology was done in 3D-Coat. The retopo tools in this

piece of software are super solid! It just works the way you want it to. A good tip is to start with the *big* quads, laying out the flow lines and loops.

It's so much faster to add extra loops with one click in between others then to add extra loops all the way around manually. It also results in much cleaner topology in general. ▶



● Speed retopo of kid, testing how quickly Zeno could achieve something useable. Turned out to be about an hour and half!



● Simulating the fabrics with Marvelous Designer





● Sculpting the facial expression

03 Marvelous Designer: One of the big reasons I like to use Marvelous Designer is that I don't have to worry about the UVs of my fabrics. Because you lay them out in a 2D view (as you would in real life) and simulate them, you can use the 2D layout as your UV coordinates without having to worry about your fabric stretching/deforming in places. Super cool! With sculpted clothing it's often annoying to get the patterns to flow right.

04 Sculpting the kid's face: When sculpting the expression, I thought I had really pushed it as far as I could – if I pushed it any further it just didn't look right. It turns out that the main problem was the shading model in ZBrush. When the character was fully shaded, with textures applied and light scattering into the skin, it was a lot more forgiving, and the expression I thought I pushed so far almost seems a little bit dull now. Knowing that I can push it a lot further in the future is something I will keep in mind for upcoming projects.

“When I knew what kind of patterns I wanted to use for the fabrics, I found photographs on the internet and then cropped and scaled them to make them tileable so they were useable as a pattern”

04



● XGen real-time preview in viewport 2.0

05 Fabric and hair: The character was textured with MARI. As for every step of the pipeline, texturing all started with finding good references. When I knew what kind of patterns I wanted to use for the fabrics, I found photographs on the internet and then cropped and scaled them to make them tileable so they were useable as a pattern. I like to think of texturing as building up layers (just like shading!) So first I would lay out the pattern of the fabric, and then use a lot of procedural noise patterns to break up the textures. After doing that, I hand-painted stains, dirt and dust layers, all to try to get rid of the CG look. This applied to all the materials that I painted – metals or wooden textures went through exactly the same process.

Since I switched to Maya 2016 lately, I chose to learn the ways of XGen for making hair. And holy moly, did I have a good time doing it! The real-time preview of it in viewport 2.0 is incredible – no need to test-render anything! This saved me so much time. ►

05

06 Look development: Before starting shading I made sure to create a properly calibrated, neutral light setup. Although it's important, it's not super strict though. You just want to avoid light setups that would influence your color or value choices.

07 Helmet shaders: Reading someone else's node graphs can be hard as there's so much to look at. In order to read mine better, you need to know that I build all my shaders in a logically layered approach.

Taking the shield as an example, I've got a rusty metal shader with a coating. In my layered approach, the coating will be a shader, which will be layered on top of the rust shader, which will be layered on top of the base metal shader. It's all in the masks! The metal on the helmet consists of four main layers. A shiny gray base metal, a shiny

⚡ TOP TIPS

Tip 01

It is important to get the displacement maps working correctly first, with just a gray material applied. By doing this you can really judge the forms of the model properly, without getting confused with other surface properties like sub-surface scattering which might hide mistakes you made.

Tip 02

For each shader, I try to figure out what the different maps would look like before I start. Even when you're just walking around on the street, this is an invaluable exercise to be doing. Pass a street lantern. Okay... What does the spec map look like? What does the diffuse map look like? Is it mainly relief that's causing surface breakup, or are there big differences in specularity too? That kind of stuff. Just look around and actually *look*.

Tip 03

I used Sony's 'spi-anim' OCIO profile in NUKE instead of the default 1/2.2 gamma curve to display the scene linear image. This gave me highlights that didn't burn out and it really improved the overall look of the image. Always remember that the usual 1/2.2 gamma curve is just an approximation too and can be tweaked if needed.



● Look development in a neutrally lit environment

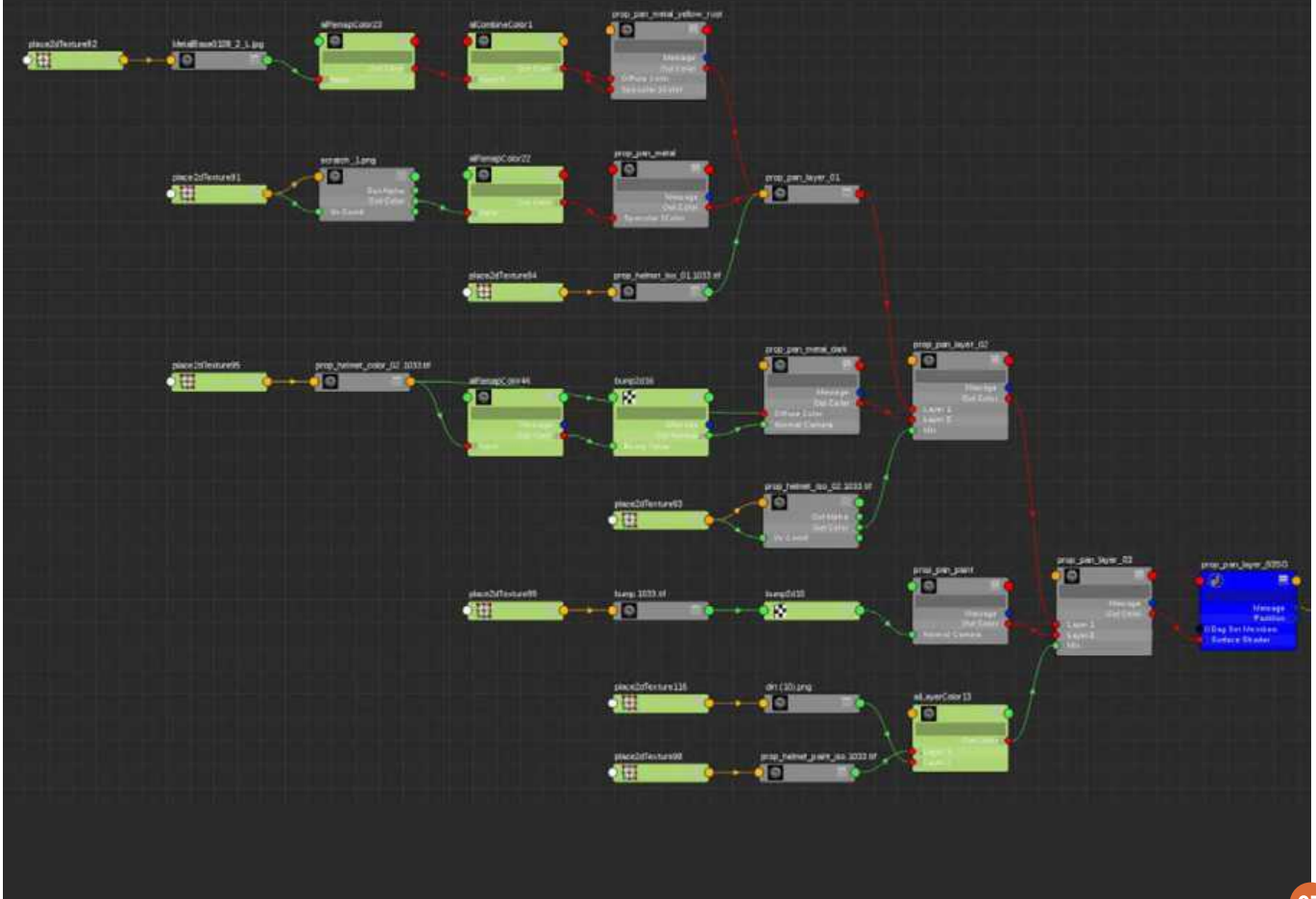
06

oxidized yellow layer, the dirty diffuse coating, and then a paint layer. The workflow is always the same, starting from painted or tileable maps and using some utility nodes to change their appearance (up the gain, lower the contrast, and so on).

Doing these operations non-destructively in Maya is much better than having to keep going back to NUKE or Photoshop to write out new images.

08 Bokeh effects: During a Zeiss talk at the FMX conference on the physical simulation of lens effects, my eyes were opened to the world of 'bad' lenses. I had never really thought about it! While the Zeiss researcher was talking about bad lenses – because they are optically not perfect – for us CG artists they can be incredibly interesting aspects. Optically imperfect optics can add a much-needed imperfect touch to your perfect computer-generated image. ●

- Helmet shader node graph. Read the shading networks from right to left, it's so much easier!



07

- The difference between using a custom filter image and a default circle



08



The Artist



Zeno Pelgrims
zenopelgrims.com





FREE RESOURCES

ZTL file

The Artist



Fabrizio Bortolussi

fabriziobortolussi.com

Software Used:

ZBrush, Marmoset
Toolbag 2, Photoshop

Fabrizio Bortolussi is a freelance concept designer and monster maker for the film and videogame industry. His areas of expertise are modeling, sculpting, texturing, illustration and concept design.

Sculpt a ZBrush monster

Concept designer Fabrizio Bortolussi guides us through the creation of his ZBrush creature, *Kappa* ▶

Create a monster with Fabrizio Bortolussi...

Welcome to my ZBrush tutorial, in which I will be covering the process of how I design, sculpt, texture and render a creature bust from A to Z, using the ZBrush, Photoshop and Marmoset Toolbag 2 software. The tutorial will cover these main processes: sketching, modeling, texturing and rendering.

We will cover creature sketching, inspiration sources, base sculpting, advanced sculpting, and micro detailing. Then we'll create UVs and render the model in real-time in Marmoset Toolbag 2, before adding the final touches with Photoshop.

01 Sources of inspiration:

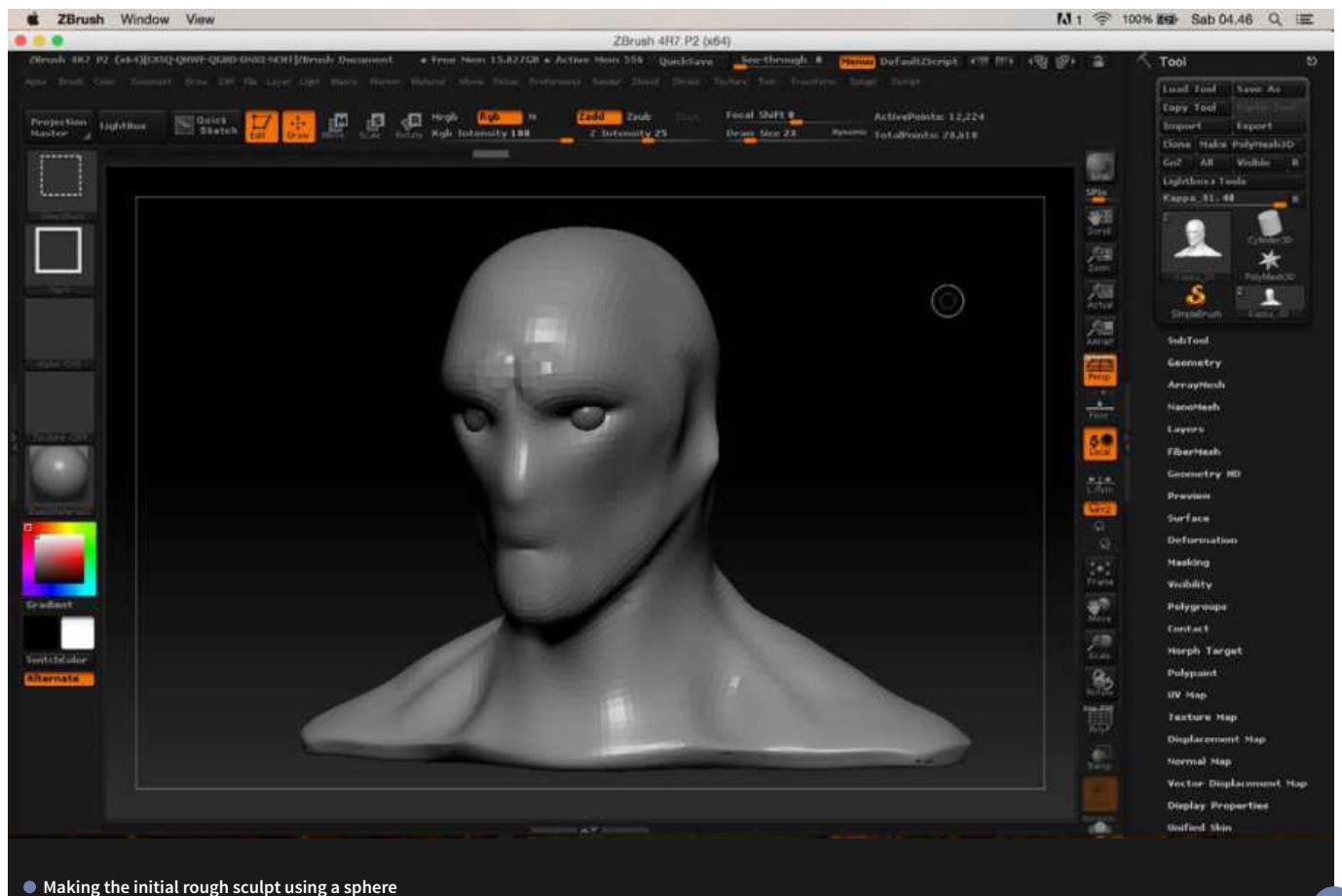
The first thing I do before starting to design a creature is get inspired, whether by something I did in the past or by any type of interesting image I come across while searching for inspiration. In this case I decide to use a resin bust I sculpted and painted as the source of reference, but keep in mind that later on I could drastically change the design or incorporate some more sources of inspiration. This is one of the most important steps in creature creation.

02 **Sketching from a sphere:**

I start to play with a PolySphere and add just a few levels of subdivision in order to pull and push the geometry. In this phase I am not concerned at all with details, just with trying to create a very basic shape that's similar to the reference image. This should be a very relaxing phase. The more excited you get with the basic sketching, the more beautiful your design will look like at the end. And it's just a matter of having fun, brainstorming and sparking your passion while moving vertices and big chunks of low-res polygons. Two PolySpheres popped inside the geometry as the eyes concludes this step. ►



- The resin sculpt used as a basis for this creature

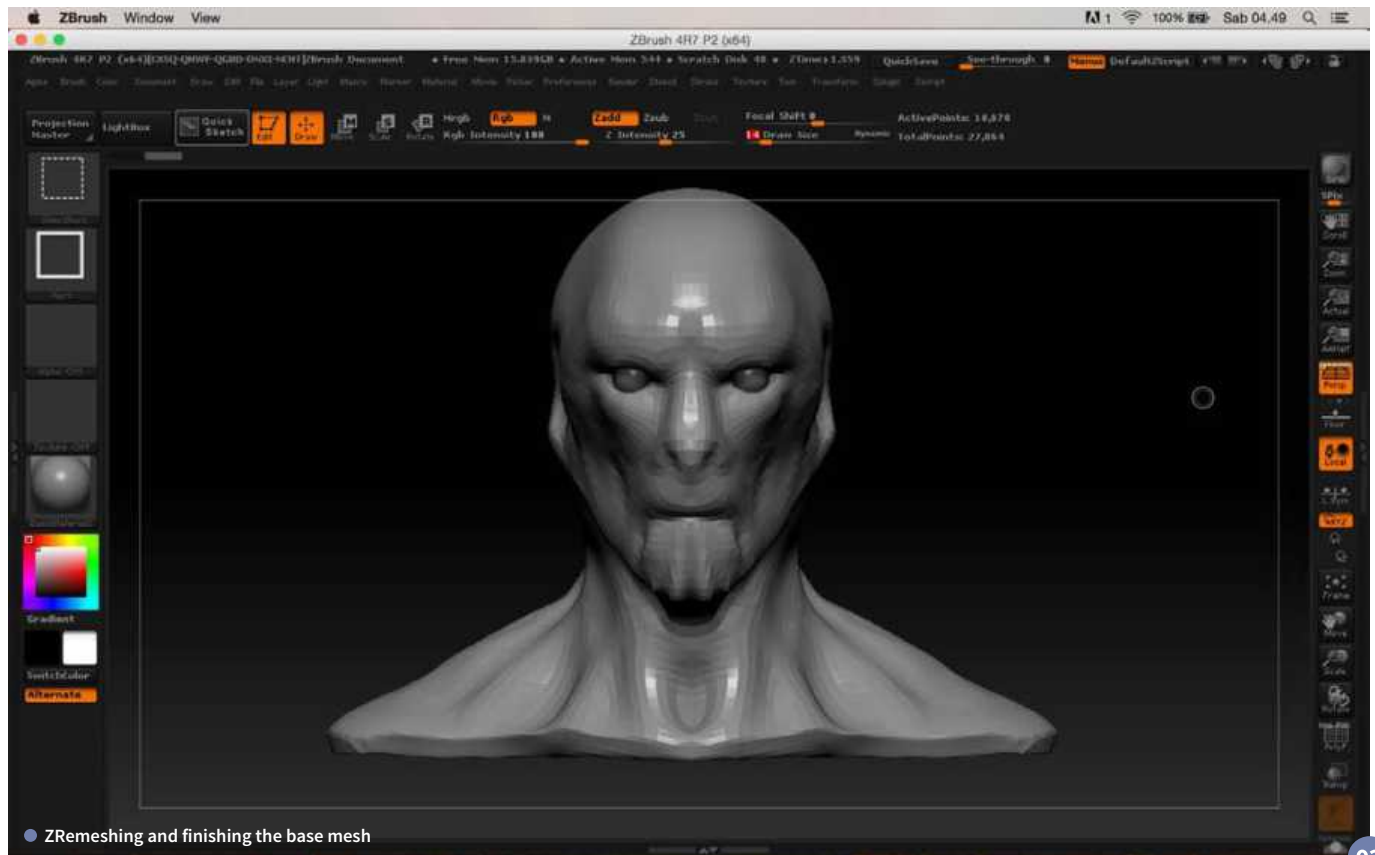


- Making the initial rough sculpt using a sphere

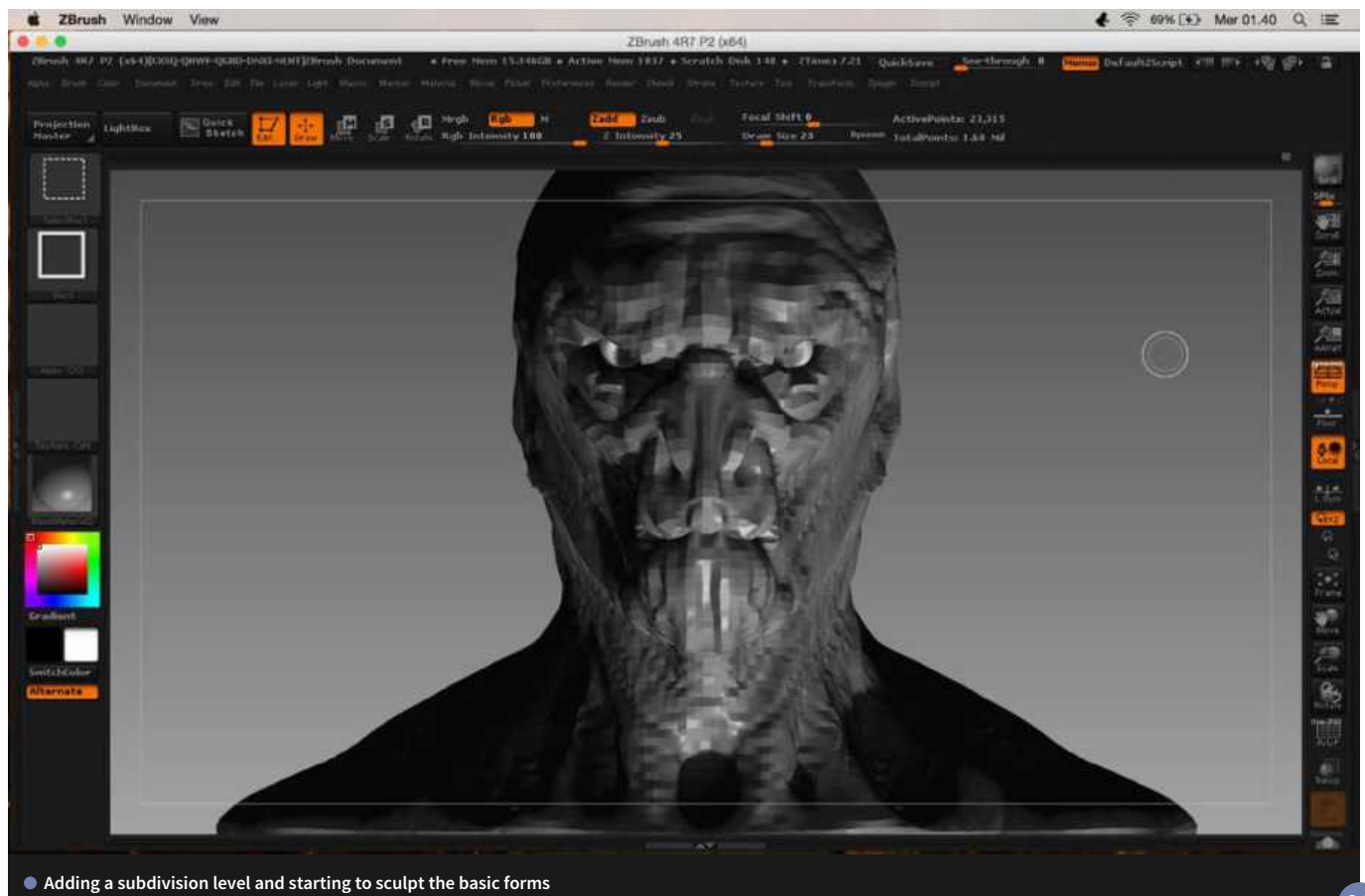
03 **Finishing the base mesh :** Now that we're happy with our messy blocked-out shape, we'll use ZRemesher on it in order

to get a clean topology. In this way I can move the proportions without being concerned about pulling and pushing geometry too much.

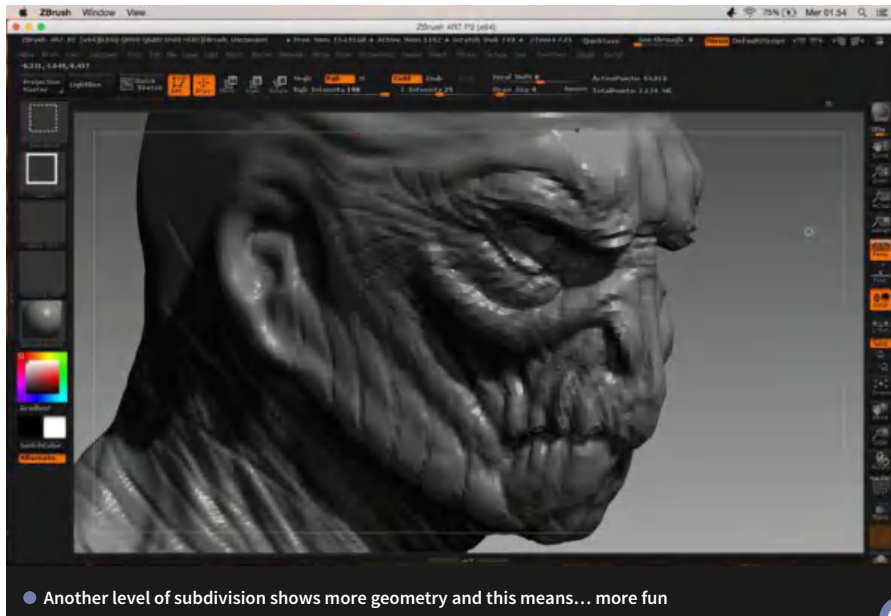
We are still very low res so, even though we ZRemeshed our model, we are not yet ready to pull and push the proportions too much, but we



03



04

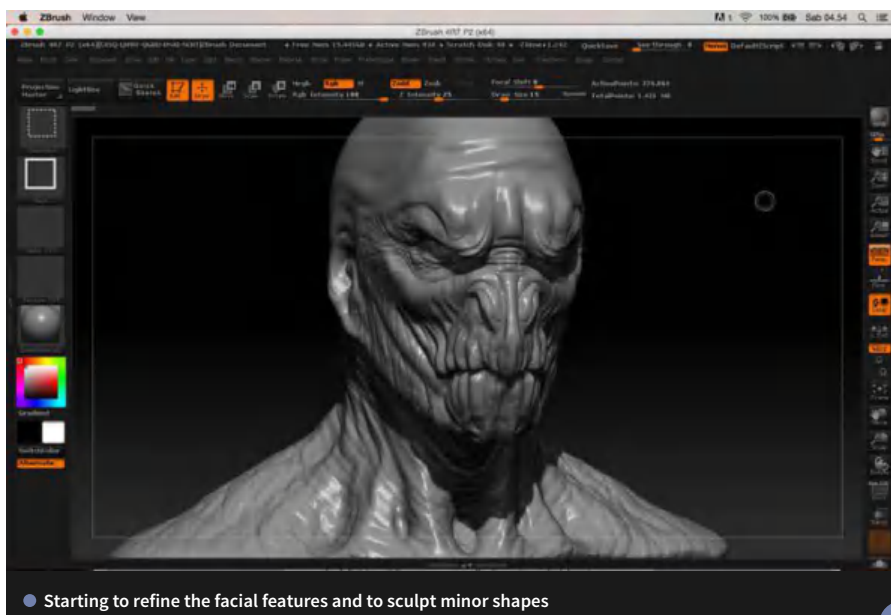


can finalize our base mesh, trying to stick with our reference image, moving vertices around and trying to end up with something we like.

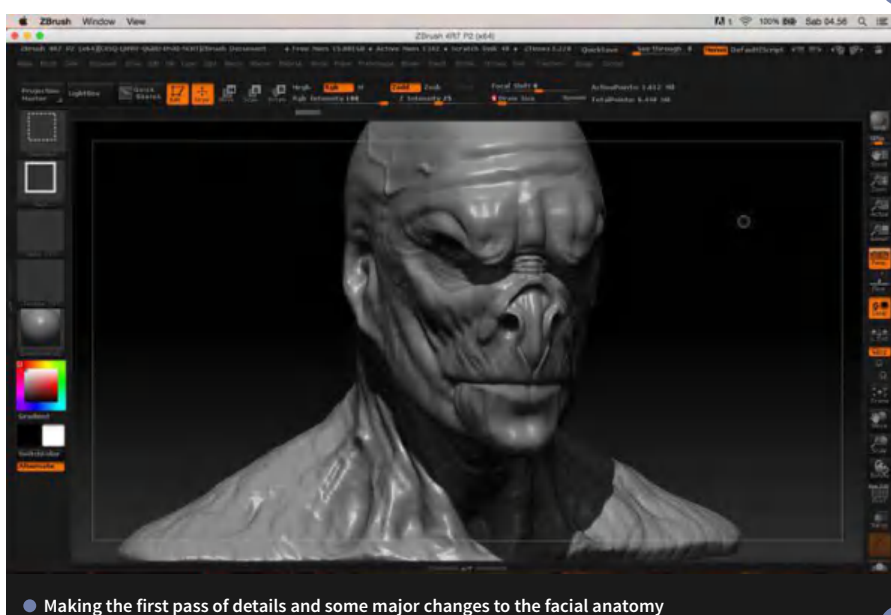
04 Adding subdivision levels: Now that we have some more resolution and geometry to work with, let's start building up some basic facial features with the Clay brush. This process is crucial for the next steps since we will then sculpt finer and finer forms around the basic facial anatomy that I am sculpting at this level of subdivision, which is still pretty low res but enough for a nice facial foundation. Before adding a new level of subdivision, I observe the model from every possible angle changing the light position to see how it looks like from different directions.

05 More subdivision levels: After adding a new level of subdivision I instantly see the basic forms smoothed out. The resolution is still low but I can start to flesh out smaller shapes, using both the clay brush and the standard brush. I don't want to stress the geometry too much right now, so I keep smoothing and refining the forms I have sculpted on the previous level of subdivision, adding some new smaller forms to our facial anatomy.

Moving the lights around, I can clearly see this guy is starting to get some personality. Of course, I sculpt with symmetry on for now to save time. This is not clay so since we have the chance to use symmetry... why make our life harder? I might decide to make his face asymmetrical when finished or to just leave it symmetrical. Let's see what happens.



06 Refining the face: I add a new level of subdivision and now we start to get a denser and more smooth geometry. At this phase it's still too early to think about adding details, so I will focus on refining even more the features I sculpted before and I'll evaluate the surface in order to decide if I should change some features or leave them like they are. It's always hard to decide when you start to see your model come to life, but since I can't sit forever in front of ZBrush. I decide to slightly change a few facial features using the move brush and the smooth brush.



07 First detail pass: Now I hit subdivide again and I finally start to see a pretty dense mesh. The geometry right now is very smooth and I can start to finalize the facial features and sculpt the first pass of details. At this point, since this is not the final level of subdivision, I won't use alpha maps to sculpt pores and micro details, but I start to add smaller shapes to my creature. ►

As I sculpt and move the light around, shooting a few quick renders, I can see that the creature is starting to look more and more realistic. Sculpting lip details, nose details, eye socket wrinkles and so on makes this process even more exciting, because right now I know exactly the direction I want to take. I decide to change his facial anatomy, getting inspiration from Marcus of *Underworld: Evolution* – in my opinion the best vampire design that's ever been made. So I mix the features of my source reference image with some new inspiration, and I end up with something I really like.

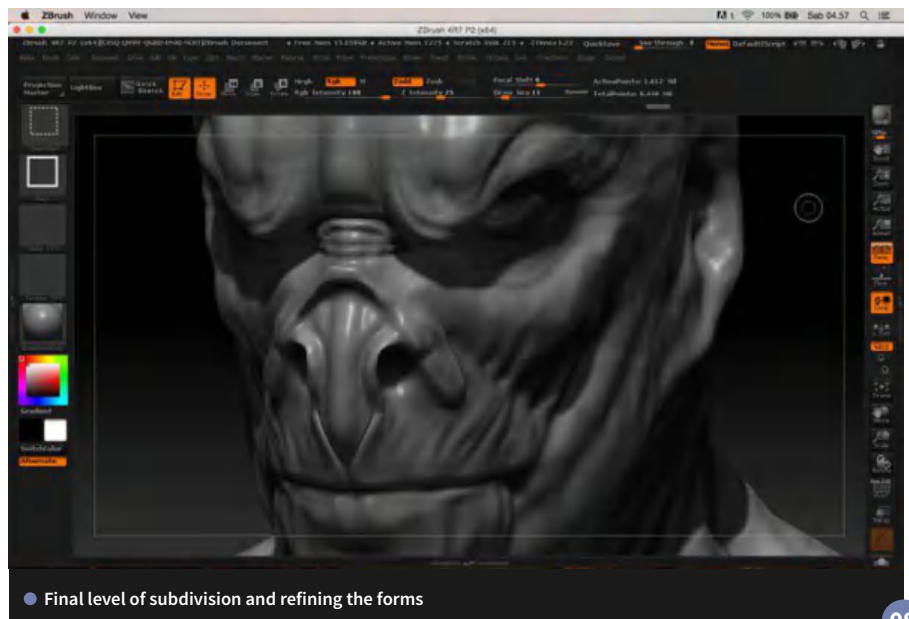
08 Refining the forms: Now that I'm on the final level of subdivision I will just focus on refining each shape I see, and make sure the entire model looks sharp and ready for micro detailing. With the Smooth brush at 25% intensity, I slowly start to smooth everything out, paying attention not to erase or wash out some of the smaller forms.

This is a very important phase before adding micro details. The reason? If you have very smooth and flowing anatomy, your micro details will look natural and realistic. Make sure you spend some good amount of time on this phase and don't rush immediately onto micro detailing. I know that micro detailing is a fun and exciting process but make sure your anatomy looks neat and sharp first. Otherwise your micro details will look weird and not very natural.

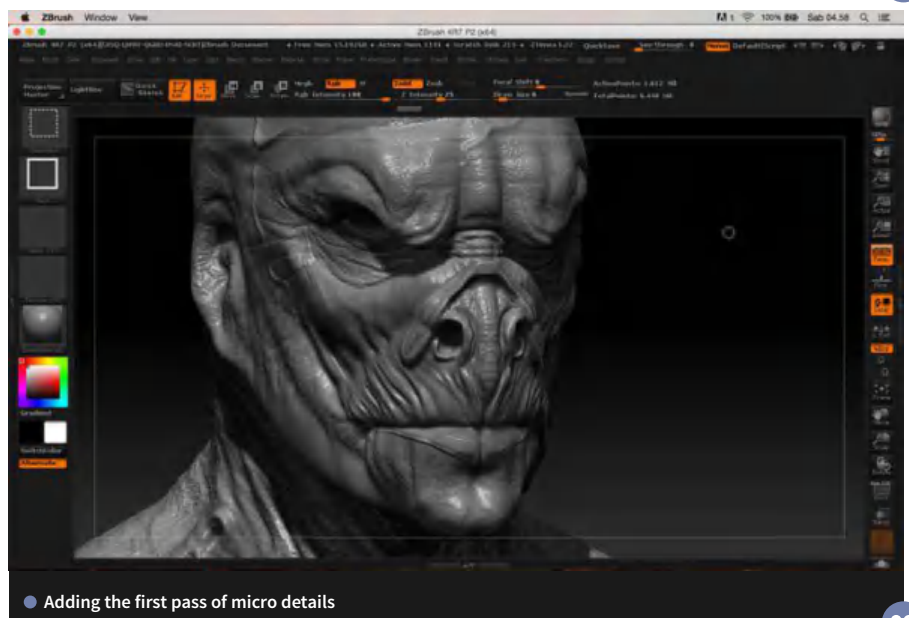
09 Adding the first pass of micro details: So here we are. The model is almost complete. Almost? Yes, because I still need to put some love on it. And this love is called 'micro detailing'. I gather a bunch of alphas around the net and create a few myself using Photoshop (they don't need to be high resolution for this detailing purpose) and slowly start to add pores, veins, wrinkles, and so on, to the creature's face and neck. Be careful, though – an overdose of tiny details will make your model look really bad since its facial anatomy will be covered with too many details and this won't look good at all on the final render. Not to mention that it's gonna be impossible to texture.

The key here is: patience and a keen eye on nature. If you are not sure on how to properly add a detail, look at reference images and study how wrinkles and pores are laid out on human skin. This may be a monster, but I use the same method I'd use if I was sculpting a human face.

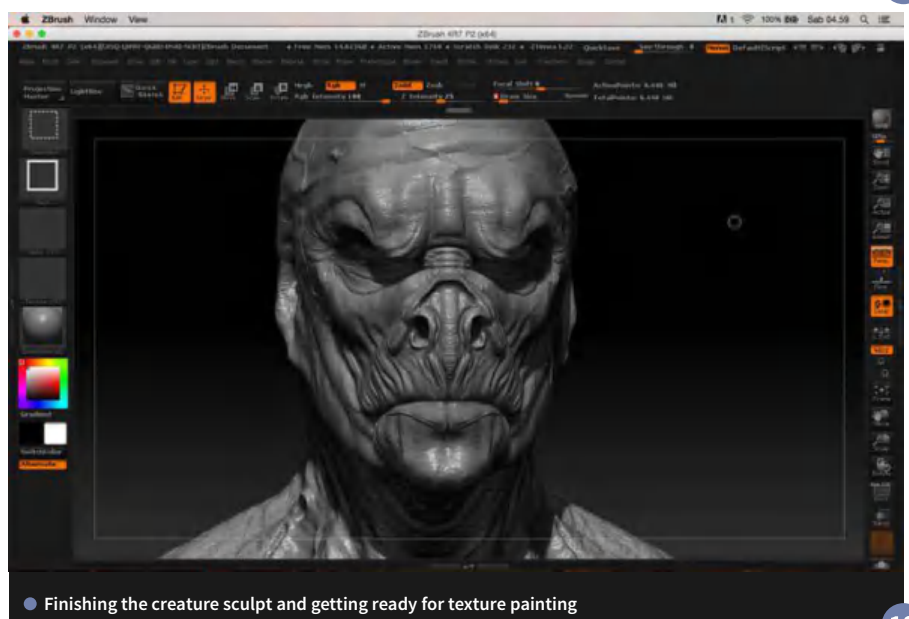
10 Preparing for texture painting: This is the last step of the modeling stage. At this point the model is almost complete, so I will



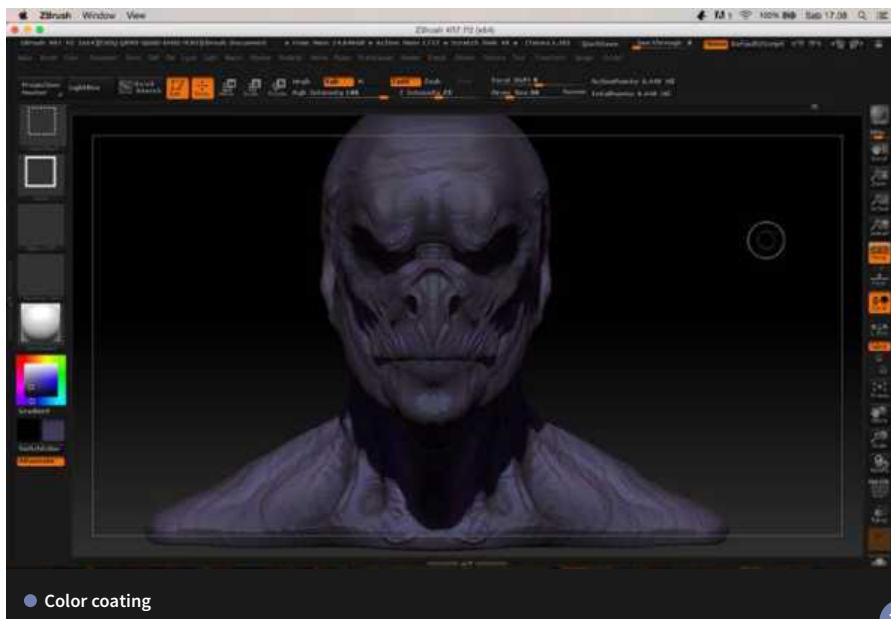
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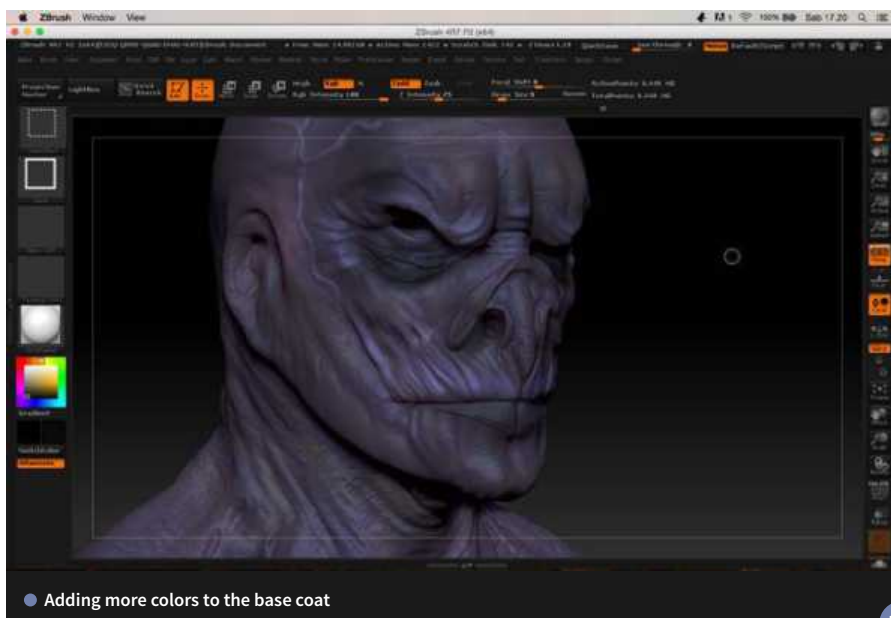


focus on finishing the micro detail pass, spraying and dragging different types of alpha maps onto the creature's face without covering the first detail pass. I want texturing to be fun and exciting and not stressful. If I'd cover up details with other details I would end up having a weird-looking creature, and so texturing it would be an almost impossible task.

Micro detailing is important, but remember not to cover your model entirely with super high-resolution sharp details, otherwise you won't be able to texture it properly since usually texturing tends to cover up a good percentage of the detail you sculpted. I move the light around, shoot another few renders and evaluate the surface and what I've done so far.

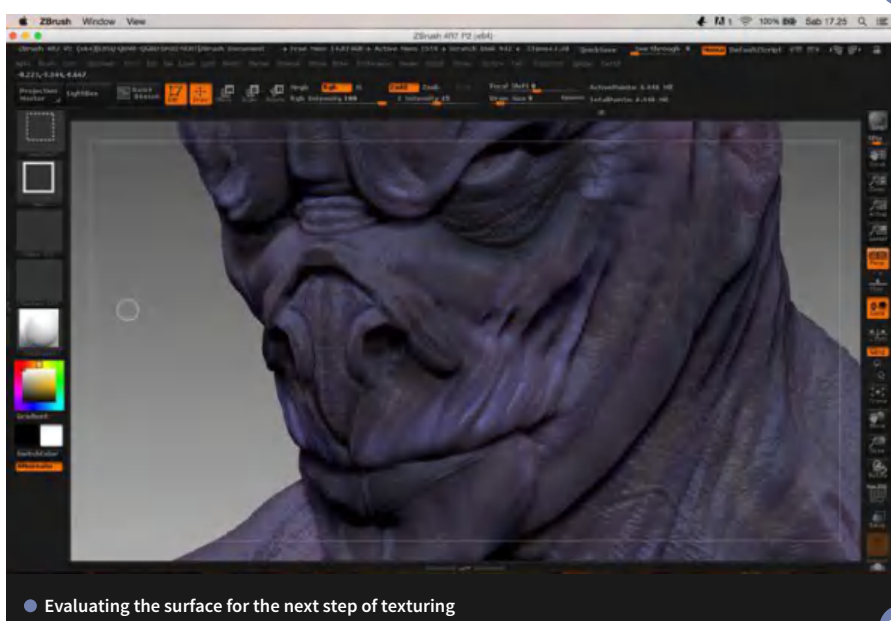
I start sticking to a reference image and then changed my mind using more reference images to give my creature a more unique and pretty look. If we can call him 'pretty'! This being said, I am more than happy with my model, so let's jump to step 11 and get ready for texturing, UV making and rendering.

11 Color coating: The first thing I usually do before starting a very detailed texture is to evaluate the sculpted details and decide on a color palette. In this case, since the mesh is quite detailed, our texture will make our sculpted details scream and look cinematic. Once I have chosen the color palette I start spreading some basic colors around the mesh using the Standard brush. At this stage I already know what he's going to look like at the end, but I spend quite some time experimenting with the basic colors I choose. This is one of the most important steps in texture painting. If you start to paint details already you'll most likely end up with a complete disaster.



12 Basic texturing: Now that we have our basic coating done we can proceed with adding softer hues and start to play with colors, making sure we keep using our color palette choice. Too many different colors would look weird and give the character a very unrealistic look. This process can take quite some time even though it's very simple. Evaluate your base colors and choose colors that suit them. Of course, happy accidents could happen, so don't forbid yourself to 'dare' using just a few other colors. But make sure you don't end up with your texture looking like the Arlecchino of Venezia.

13 Stop to evaluate: At this stage we are still very simple with our colors and hues, but I do have an idea of what he will look like at the end, so I spend some time just observing each angle of my sculpt and brainstorming on how I



will approach the next phase of texture painting. He needs some more color before we can move on to a more advanced stage.

14 Adding more color detail: I will now proceed to add some more color variations, slightly breaking the basic color scheme I had before. I won't be going crazy right now because it's still too early to start adding intricate details, though I'm going to add more hues and start to paint the cavities with darker colors. The key is to make sure your sculpted details won't be covered with color since you want them to be visible on your final image. So paint carefully and make sure you're not obscuring important sculpted details.

15 Advanced texturing: Now I have a decent-looking base texture with some nice color variations. As you can see, I didn't use many colors, just the ones I decided at the beginning, from blue/purple to yellow/brown. I start to refine them and to add more contrast and detail to the creature. I boost up the light colors and darken the darker colors in order to have a more cinematic and realistic-looking texture. I also add a few details here and there, preparing myself for the final and super-detailed pass.

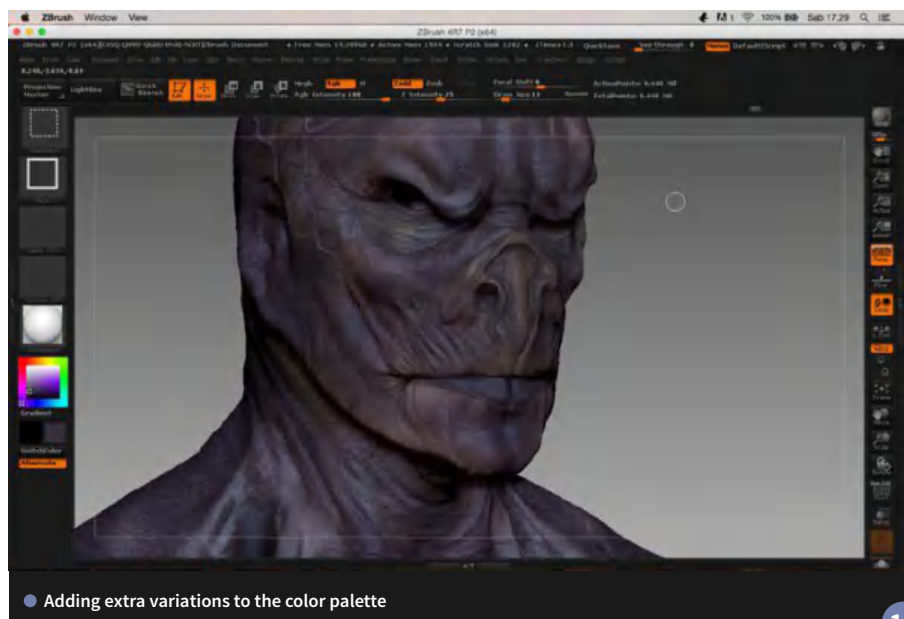
16 Finishing texture painting: Right now our creature looks good but it's time to start adding some real love to him.

So, always using the Standard brush, I start to refine each cavity of my sculpt. I paint more hues and blend more colors together (always working with the same general color palette) and detail up the skin with some alpha maps and some intricate patterns.

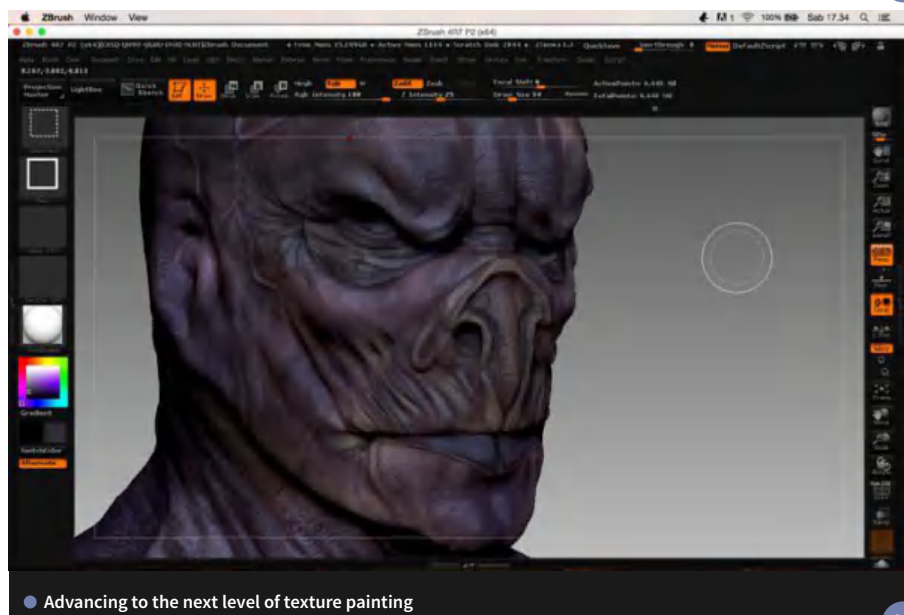
Keep in mind that, even while painting very detailed textures, you don't have to fill your sculpt with crazy details because you'd end up ruining your paint job. Texture must be very detailed but also rational.

This means your sculpted data must be visible underneath otherwise, when shading and lighting your design, it'll just look strange and fakish. This process is the longest one since I can go on painting for hours. And it's the most enjoyable one. At least for me!

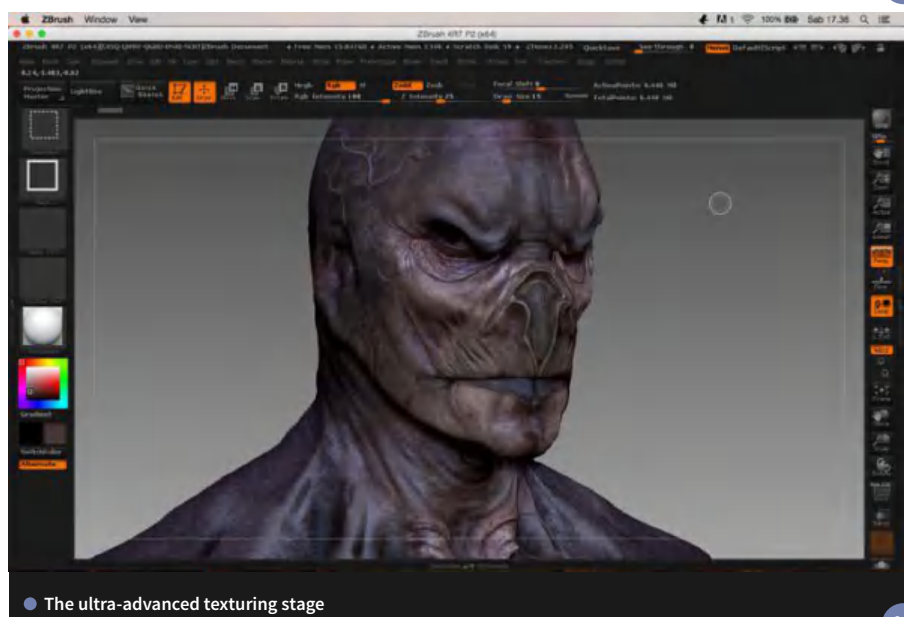
17 Finishing texture painting: The texturing is finished but I don't start creating UVs yet. I always make sure everything looks right before taking the sculpt to an external renderer (in this case, Marmoset Toolbag 2). I start to orbit around the finished and textured sculpt and check if everything looks fine and sharp.



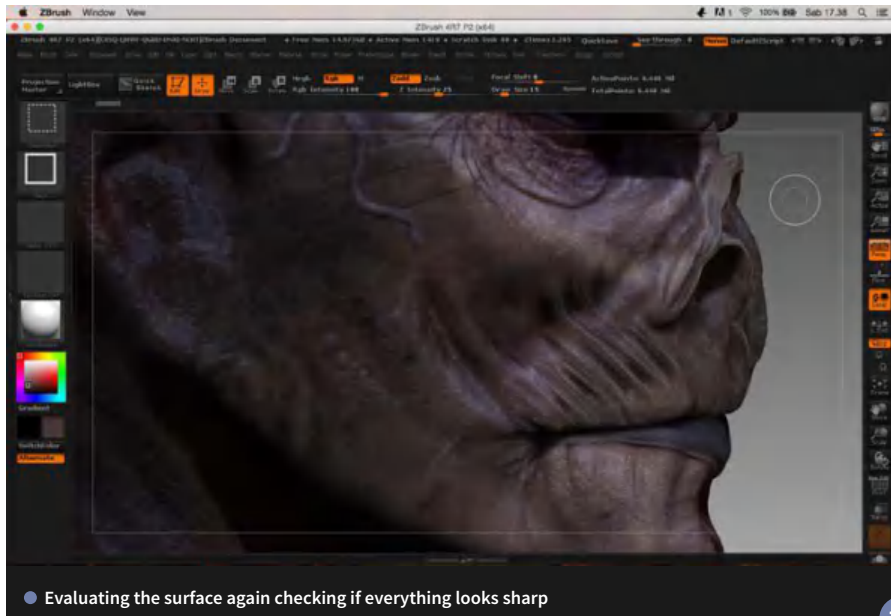
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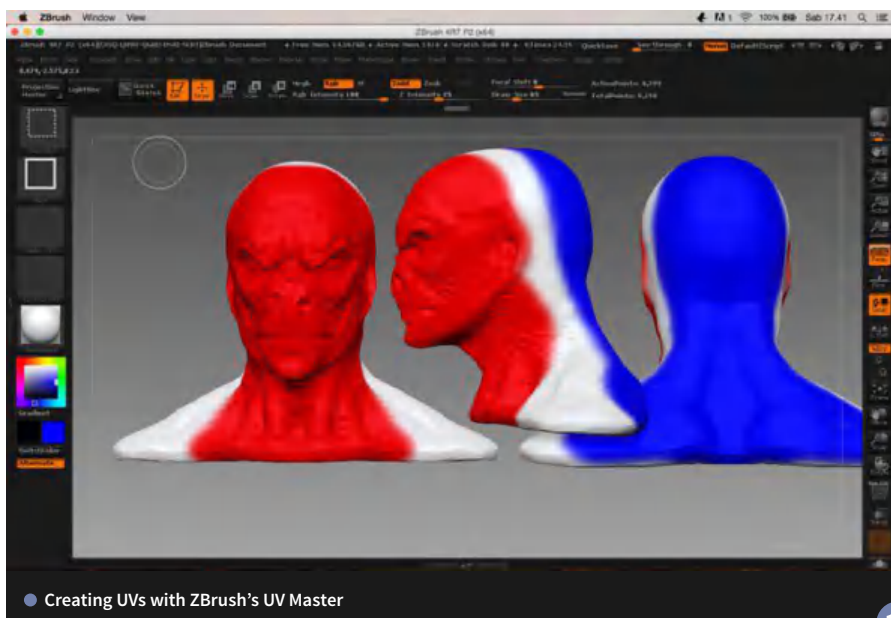


● Evaluating the surface again checking if everything looks sharp

It's common to find some areas that might be not as detailed as others, and in this case you can just keep texturing. But for a client presentation I am pretty happy with what I have, so I don't feel like I need to add anything else because if I'd add too many different patterns, I could end up with a result I don't like.

18 Creating UVs with ZBrush: Now that my sculpt is ready I'll create some UVs using ZBrush's amazing plugin UV Master. The steps are very simple. I open UV Master and click on 'Work on clone'. This will create a low-res clone of my high-res model. I then activate 'Enable control painting'. In this way I'm able to protect the front part of my creature. I will use symmetry and paint the area I want to protect by activating 'Protect'. You will see the color's gonna be red.

17 I will then paint the back of my sculpt, activating 'Attract', and the color will be blue. Make sure you leave a blank space between the two colors otherwise the UV won't generate properly.



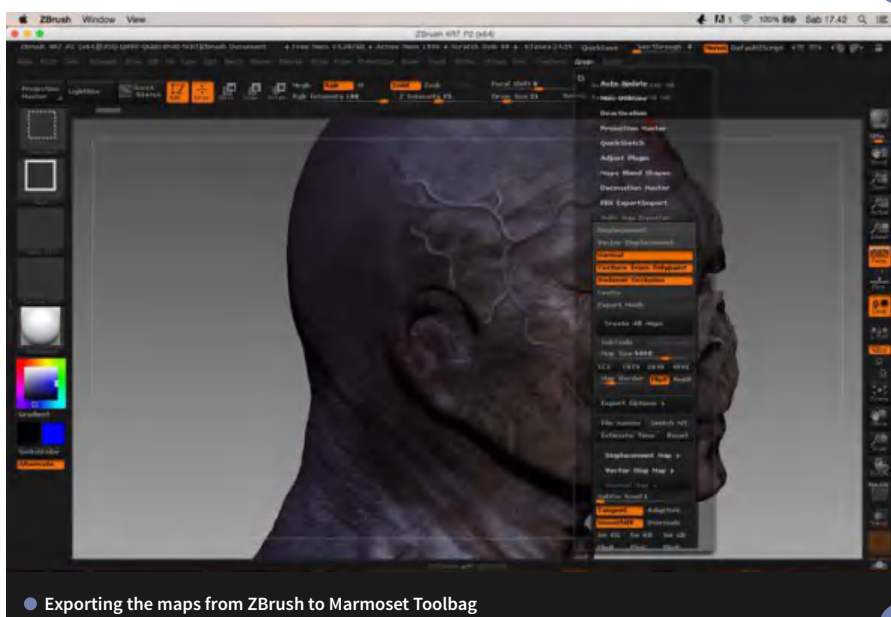
● Creating UVs with ZBrush's UV Master

Once finished, I generate the UV map and copy and paste it back onto my high-res finished sculpt. Now the UVs are done! Simple as lifting 130 kg on your shoulders when doing squats at the gym. (At least that's very easy for me!)

19 Exporting to Marmoset Toolbag 2: Now that I have my finished sculpt with UVs, I proceed to exporting a normal map, a diffuse map, an ambient occlusion (AO) map, and the base mesh as an OBJ file. For the purpose of this tutorial I won't be exporting a displacement map since it's not needed.

I choose 6K as the maps' size so that every sculpted and painted detail will look sharp in Marmoset Toolbag 2. Before jumping into Marmoset Toolbag 2, I create a specular map in Photoshop and shrink the size of it down to 2K since it doesn't need to be ultra high resolution. I also import my base OBJ in Maya and soften up the normals, so that I'll have a smooth base OBJ and won't have any issues with Marmoset Toolbag 2 when loading the maps.

Now I'll jump into Marmoset Toolbag 2 (in my opinion the best real-time renderer out there). Steps are very easy here. I create a new skin shader and load the maps I exported into the corresponding slots. I play with specularity, glossiness and other settings making sure everything looks good. Once I have done this I simply add three lights, play with their position and give them a light bluish color in order to add a cinematic look to my sculpt. ▶

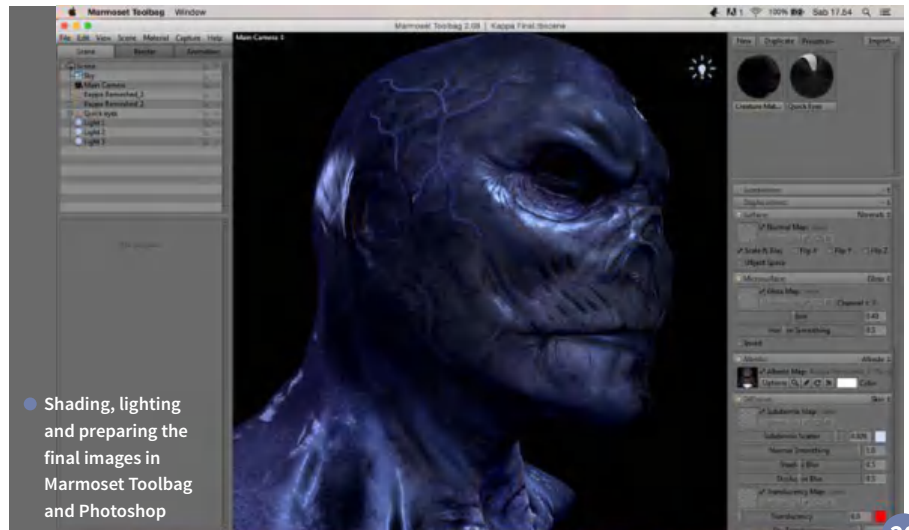


● Exporting the maps from ZBrush to Marmoset Toolbag

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20 **Finishing the image:** So this is the last part of my tutorial and, to be honest, I'm a bit sad since I really enjoyed making it and wanted to do much more! Once I'm happy with the lighting I export two renders of my creature and load them up in Photoshop. Playing with the light levels, adding some contrast and painting some quick eyes finishes up my project.

I now have two cinematic looking realtime renders that are ready for client presentation. This concludes my ZBrush tutorial. I hope you had a blast reading it like I had a blast doing it. As you've seen, it's just a matter of enjoying what you're doing. If you really like your final result, then it means you did the right thing. Happy ZBrushing everyone! ●



20

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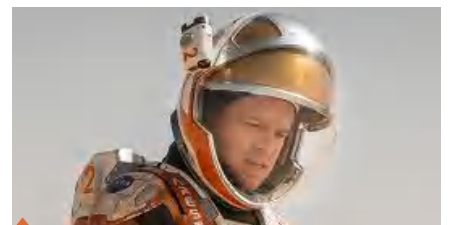
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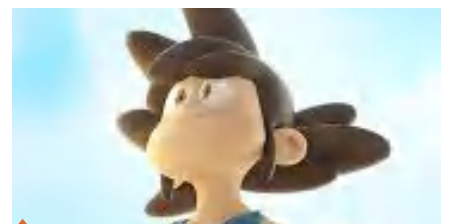
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